Selection guide

Robotic Finishing Solutions
Application of the liquid paints

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Robotic finishing solutions
Application of the liquid paints

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:: Editor's note

In order to help you increase your productivity, hence your competitiveness, Sames Technologies daily dedicates itself to excellence in terms of innovation and reliability. We thus constantly bring about improvements as far as quality and performances of your finishing process are concerned, in order to meet your requirements.
We enable you to benefit from reliable technologies while ensuring you a swift return on investments.

You will find in this catalogue the solutions to your needs that will enable you to reach the paint application results you are aiming at. We also help you in defining the equipment allowing your installation to comply with V.O.C. directives. All the Sames teams remain at your disposal to answer your questions and to attend you in defining your paint process.

Good reading.

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:: A strong identity at your disposal

For several decades, Sames Technologies has acquired a vast knowledge and has built up a unique know-how in lots of different fields of activity.

Numerous installations in the fields of car manufacturing, tier 1&2 and in many other fields, are equipped with our electrostatic solutions.

This know-how is for you the guarantee that we are men of experience, able to grasp your needs and to speak the same language.

It is also the guarantee for you to work with technicians that are able to lead you towards the best technical alternative and to offer you a reliable solution regarding your application.

You surely can count on our know-how to enable you to reach your efficiency goals in a durable manner.

Sames will put itself on the line to find with you solutions to improve your competitiveness and to make your investments cost-effective.

We work in cooperation with our customers on the different markets all over the world and contribute to the improvement of their competitiveness. This approach mainly comes in the following points:

> Increase of the productivity = to increase the rates of production by cutting down on products and reducing maintenance operations

> Requirements for a high quality application

> Control of the V.O.C. emissions

> Change from solvent to water based painting process

> Adaptability to the ever growing number of colours = fast colour change with minimal paint losses

> 2-K Process

> High solid contents

> Unlimited number of colours

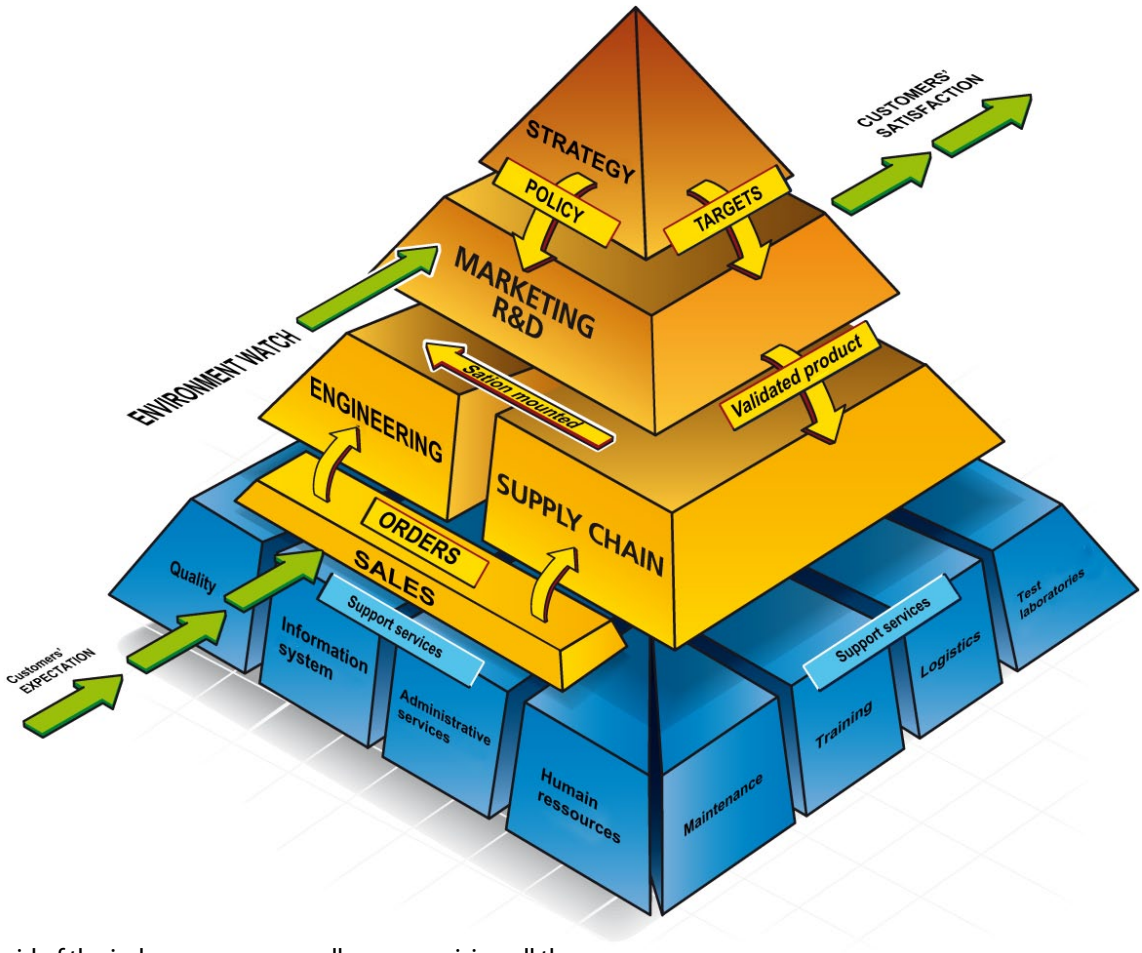
> **"three wet" process** (without force drying)

> **"short range" process** (without primer)

:: Quality insurance

In conformity with the ISO9001 standard - issue 2008, the requisite procedures and registrations are mastered. The seriousness with which Sames' quality policy is dealt ensures you an optimum quality at each stage of the production and of the assembly of the components.

Our equipment is subjected to the following European directives:
- 94/9/CE Explosive atmospheres
- 2006/42/CE Machines
- 2006/95/CE Low voltage
- 2004/108/CE Electromagnetic compatibility
- 97/23/CE Pressurised equipment
- 2002/95/CE ROHS Limitation of dangerous substances
- 2002/96/CE WEEE Electronic and electrical equipment waste
- 1907/2006/CE REAC Registration, evaluation and authorisation of chemical substances



A pyramid of the in-house processes allows organizing all the stages while being very attentive to the various environments (customers, competition…), to the audits (inner and outer) and to the indicators linked to the defined aims.

Stronger for the acquired experience in the field of painting processes worldwide, Sames partners its customers to rationalize the costs of finishing:

> Improvement of the transfer efficiency of the paint equipment
> Minimization of paint losses
> Optimization of paint processes
> Guarantee of a high reliability rate

Assembly and validation platform prior shipment in MEYLAN - FRANCE

:: Liquid paint solutions

Whichever your process may be, there is always a well-tried painting solution to carry out your application:

> Solvent based paint
> Water based paint
> 2-component paint
> Metallic paint

In close collaboration with our technical teams, a solution will be worked out to meet your needs; our range allowing equipping any type of installation.

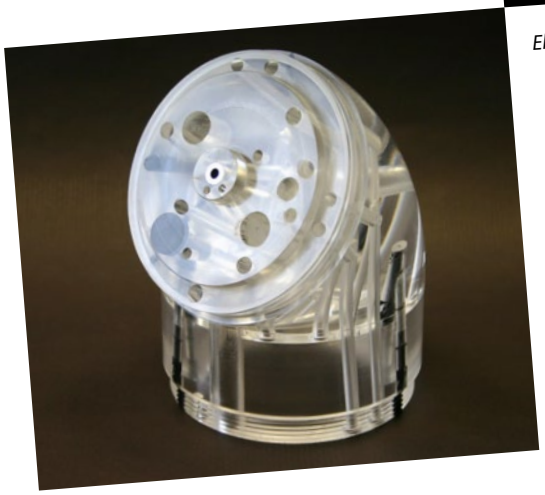
Clear coat application on bumper - PPH 707 SB

Base coat 1 cut-in - ACCUBELL 608 or PPH 707 SB

:: Research & Development

Sames' main activity is to increase the productivity of its customers by designing and manufacturing innovative electrostatic systems. Launching new products on the market is the core of our organization.

Electric field

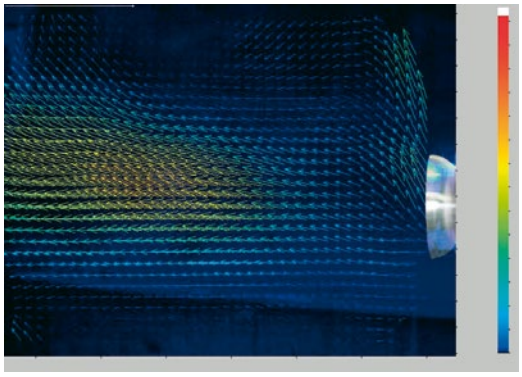


Atomizer body

Sames' know-how, our large investment in Research & Development as well as our reliability-proven equipment allow us proposing our customers integrated robotic solutions.

:: Engineering partnership

Thanks to high-tech equipment and a dedicated program, our specialists model your project in 3 dimensions and virtually conduct the realisation of robotic paths. The validation of the process on the screen presents you with obvious advantages: test of the most efficient paths as well as a precious time saving for the technicians for the adjustment and the final assembly on the production site.



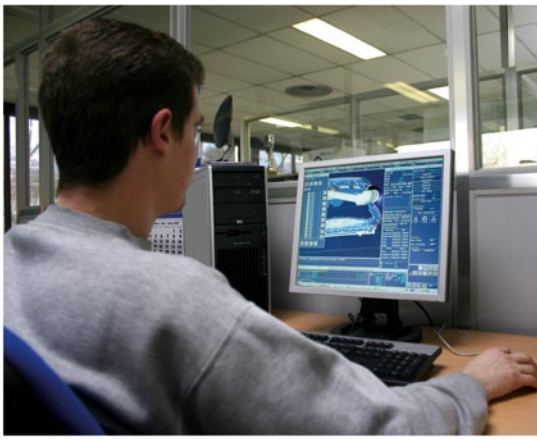
Study of the speed and size of the paint particles at rotary bell output.

Sames masters the design and the running of its automatic functions with EASYPAINT.

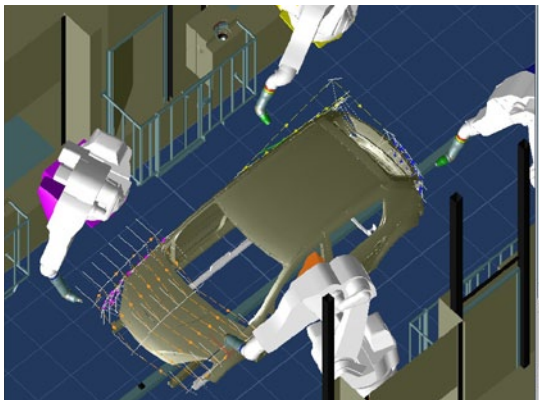
> 25 years of experience
> High flexibility and adaptability for the control of the parameters
> Accuracy of the adjustments

> Descriptions of the software programs that pilot installations:

EASYPAINT is a concept that gathers the most advanced and proven techniques in terms of supervision, communication and decentralized intelligence, and simulation of application. It is a convivial tool that enables the operator to visualize the functions of the process as well as the interfaces with the environment.



ROBCAD tool is an expert system for paint application; it allows the simulation of:
> paths,
> execution of the cycle times,
> accessibility,
> spraying tables.



:: Customer service

Sames Technologies has worked out a complete offer of services, adapted to all your needs:

advice, repair, maintenance or intervention by a qualified technician. Which ever your request may be, Sames Customer Service department, a team of 20 persons, is at your disposal to answer your needs within the shortest time.

> ASSISTANCE AND TECHNICAL SUPPORT

+33(0)4 76 41 60 01

In order to make the most from your installation, paint or powder, advice and expertise of specialists are essential. Made of practical, experienced men, Sames customer support will carry out a diagnostic of your installation and will provide you with a worthy technical assistance for the improvement or retrofit of your paint line.

Services and technical assistance contracts:
> Technical assistance on site
> Preventive maintenance
> Retrofit
> Audit and optimization of the process

> REPAIR

+33(0)4 76 41 61 39

A regular, and carried out professionally, maintenance or a retrofit of your equipment, is the best way to guaranty the correct running of your equipment. To this end, do not hesitate and contact one of our technicians:

> to have technical advice or technical assistance by phone
> to have one of your product repaired or controlled
> to carry out a retrofit

> SPARE PARTS

+33(0)4 76 41 60 60

Original spare parts guaranty the correct running of your equipment. We are there to deal with all your orders of spare parts throughout the world. Thus, our aim is to rapidly supply you and at the best price, with the wished part in order to guaranty an optimum and prolonged running of your paint or powder application equipment.

> TRAINING

+33(0)4 76 41 61 60

Sames Technologies is registered as a training centre by the French Ministry of Employment.

Training cessions that allow you learning the requisite knowledge to the use and the maintenance of your equipment are organised throughout the year. A catalogue can be obtained upon request. You will be then able to choose among the proposed selection of training courses, the type of training that meets your needs or production aims. These training cessions can be organised within your premises or in our training centre located in our headquarters in Meylan.

:: Robotic configurations

The automotive industry is continuously evolving. It also demands constant improvements of its processes. Today's trend is an ever increasing personalization of the vehicles, which is carried out by paying more attention to details, both inside and outside of the car bodies.

If the flexibility demand exists, the quality demand is itself also constant. Going robotic solves the equation allying quality and flexibility. During the process, which differs from one finishing technique to another, the paint robots are installed to carry out the application of the successive necessary product coats (primer, base, clear).

The kinematics, the control of the parameters and the adjustment are extremely accurate in order to cope with production and quality requirements.



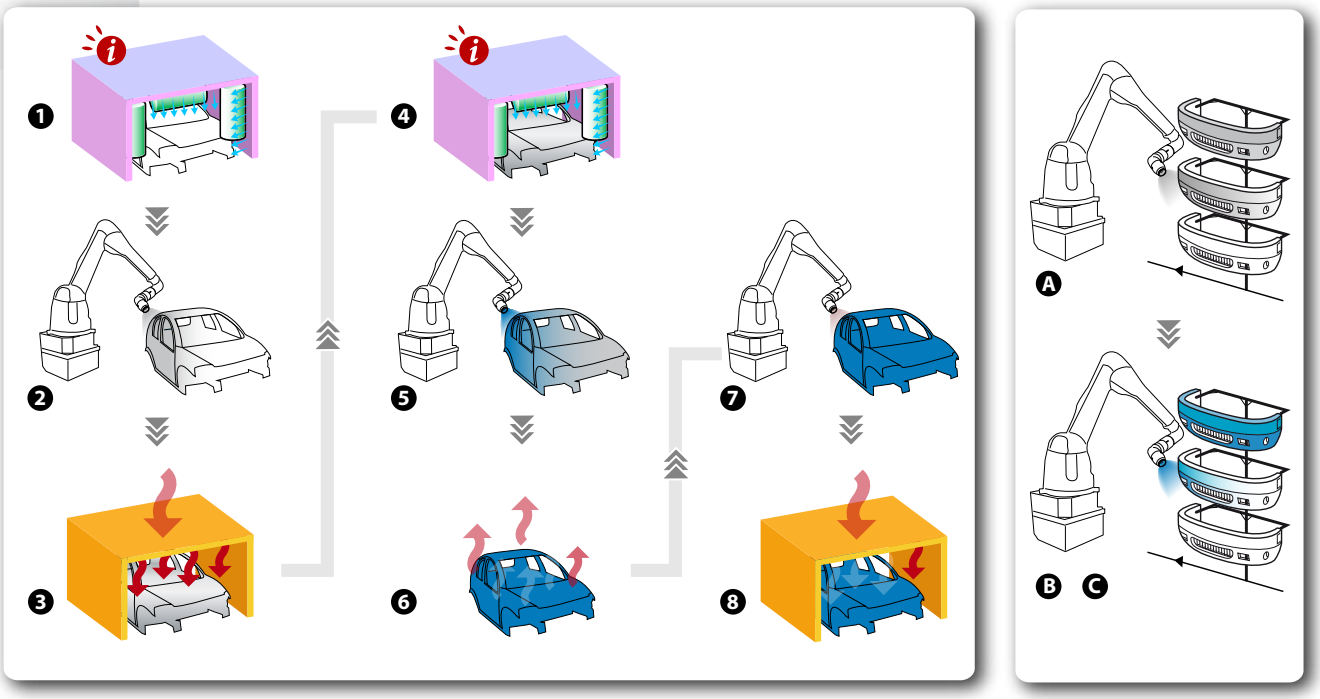

Sames integrates the robots dedicated to the paint spraying made by the greatest robot manufacturers in the world.




:: Fields of electrostatic paint application on car bodies and automotive tier-one

Examples of painting processes and of the main functions of the applied coats:

Car body *Bumper*



Sames proposes a vehicle dusting system before they enter the paint line.
*Refer to chapter **"Feather dusting machines"**.*

Stages :

1/ Dusting

2/ Primer application
or
A/ Application of a conductive primer

3/ Force drying

Main functions:

- Suppression of the dust particles
- Sanding (preparation of the surface to apply the base coats)
- Anti-chipping (for the tinted primers)
- Aspect depending on the final colour
- Anti-UV protection

4/ Dusting

5/ Application of base coats 1 & 2
or
B/ Application of base coats 1 & 2

6/ Solvent cleaning, flash-off

Main functions:

- Suppression of the dust particles
- Final colour
- Metallic or pearly effects

7/ Application of the clear coat
or
C/ Application of the clear coat

8/ Force drying

Main functions:

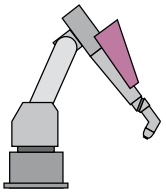
- Aspect and final aesthetic
- Durability and protection

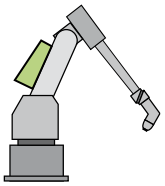
:: Integration approach for the paint application

The constant research for productivity and the increasing automation of the painting process thanks to robotics, lead the development of the paint application technique. This evolution of the technique leads up to increasing speeds while using the flexibility of the robots; one thus improves the paint application performances, the speed of execution and the paint quantity being used. For all these reasons, Sames "**Range 7**" allows you accessing to most high-tech robotic technologies in the field of automotive paint application.

The complete process of the paint line will be defined with respect to the different application requirements (interior or exterior).

Type of recommended robot

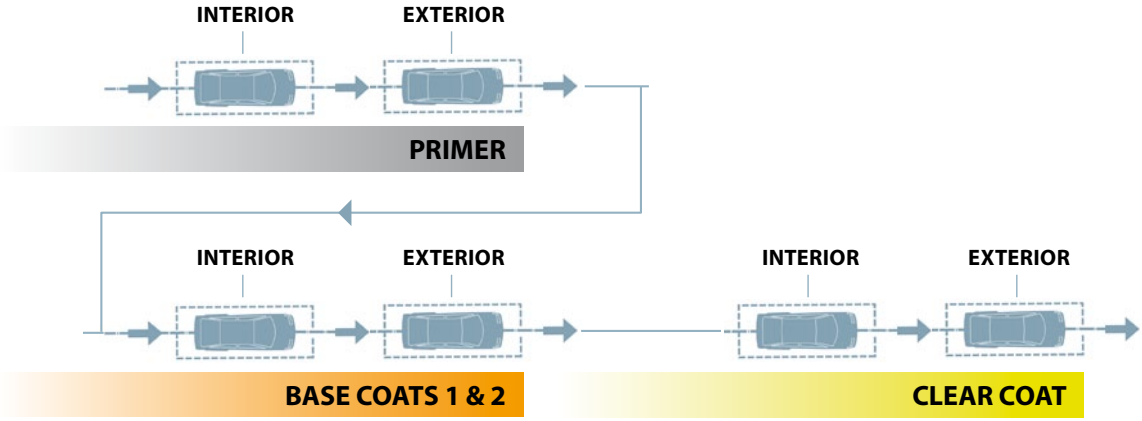




> Choices of paint application solutions:

Application area	*Paint*	*Electrostatic solution*	*Process Arm*	*Slim Arm*
Interior	Solvent based	PPH 707-SB, 707-MS, TRP	✓	✓
	Water based	Family ACCUBELL	-	✓
Exterior	Solvent based	PPH 707-SB, PPH707-MS	✓	✓ in the case of additional or special colours
		TRP 501/502	✓	
		ACCULOOK 707-SB	✓	
	Water based	ACCUBELL 708-500/800	✓	✓
		PPH 707-EXT	✓	✓
		ACCULOOK 707-EXT	✓	-

> The above mentioned electrostatic solutions can be then installed into the process of a standard line:



:: Integration « Process Arm/Slim »

> Numerous requirements characterize the manufacturing processes in the field of the car industry: production rate achievement, flexibility, accuracy and limitation of the consumption of the applied products.

> Another major concern is the respect for the environment. This implies the reduction of V.O.C. (volatile organic components) emissions and of solvents.

The sprayers present the following advantages:
• a good integration
• an accurate management of the applied products (flow, consumption),
• carefully designed and optimized colour change,
• reduction of rinsing/paint product losses,
• a high flexibility.

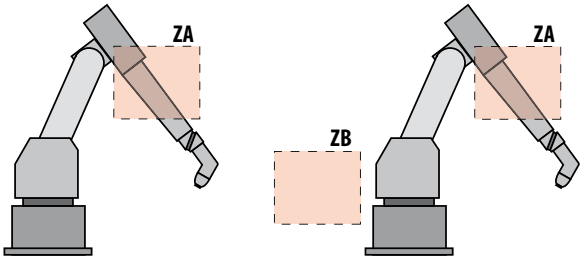
> Built-in colour-change block placed at the nearest of the sprayer to reduce at the maximum the quantity of product in progress. Most of the robots allow this type of configuration in their arm (**ZA**) or next to them (**ZB**).

Our robotic integration solutions enable the installation of several colour-change blocks to supply a more important number of colours:

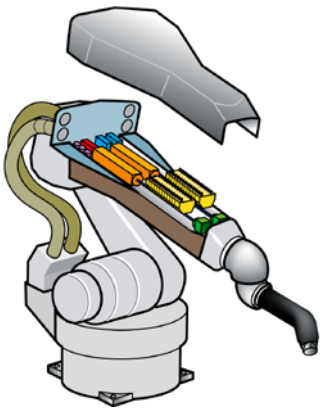
• quick colour-change in masked time,
• use of two different circuits for products that are non compatible when rinsing.

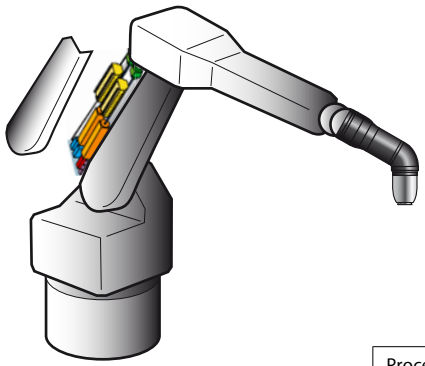
Maximum number of colours with «Process Arm»

Area	Depending on the type of robot being used
ZA	Up to 36 (ex: 1x28 or 1x24 or 2x16 or 2x14 or 1x36)
ZB	Unlimited number of colours
Total ZA + ZB	> 36



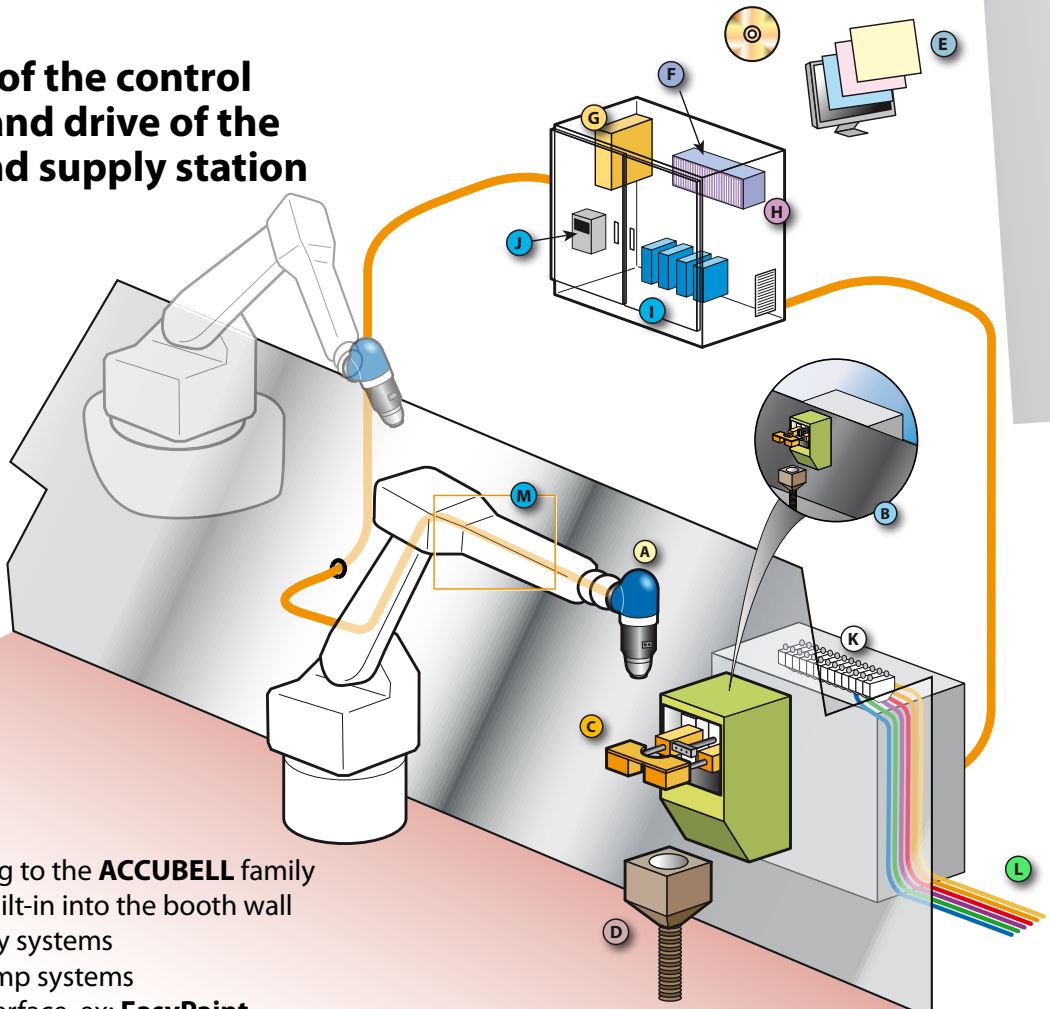
> Differentiation of the built-in equipment with respect to the type of robot





	Type of Robot		
	Process Arm	Slim arm	Slim Arm for ACCUBELL
Air supercharger (turbine and shaping air)	✓	✓	✓
Sensor for optical fibre/microphone	✓	✓	✓
Electro valves	✓	✓	✓
Motors	✓	✓	
Colour-change blocks	✓	✓	
Supply pumps	✓	✓	

:: Description of the control components and drive of the ACCUBELL® and supply station



A: Sprayer belonging to the **ACCUBELL** family
B: Supply station built-in into the booth wall
C: «**Docking**» supply systems
D: Cleaning and dump systems
E: Man/machine interface, ex: **EasyPaint**
F: Management of the various software programs
G: Management of the paint reservoir for ACCUBELL
H: PLC
I: Management of the application parameters (Turbine, shaping air, rotation speed, etc...)
J: High voltage management module «**GNM200**»
K: Colour-change block «**MODUCLEAN**»
L: Product distribution system
M: Slim Arm for ACCUBELL

Wall-mounted docking station for 7-axis robot

Integration

- Programming and touch up of the paths with 3D simulation
- Reduction of the assembly and commissioning times
- Easypaint software programs to manage the line
- High reliability proven standard process
- Referenced by the automotive and Tier 1 manufacturers

Notes

Range 7

PPH Family

PPH 707-SB
SB-2K

PPH 707-MS-GUN

PPH 707-EXT

ACCULOOK Family

ACCULOOK707-EXT

ACCULOOK 707-SB

ACCUBELL Family

ACCUBELL 708

500 & 800cm³

ACCUBELL 608

250cm³

Interior

GUN Range

TRP 501

TRP 502

Solvent based paint

Two-component paint

Non flammable or hard to set fire water based paint

Electrical charge by direct contact (internal charge)

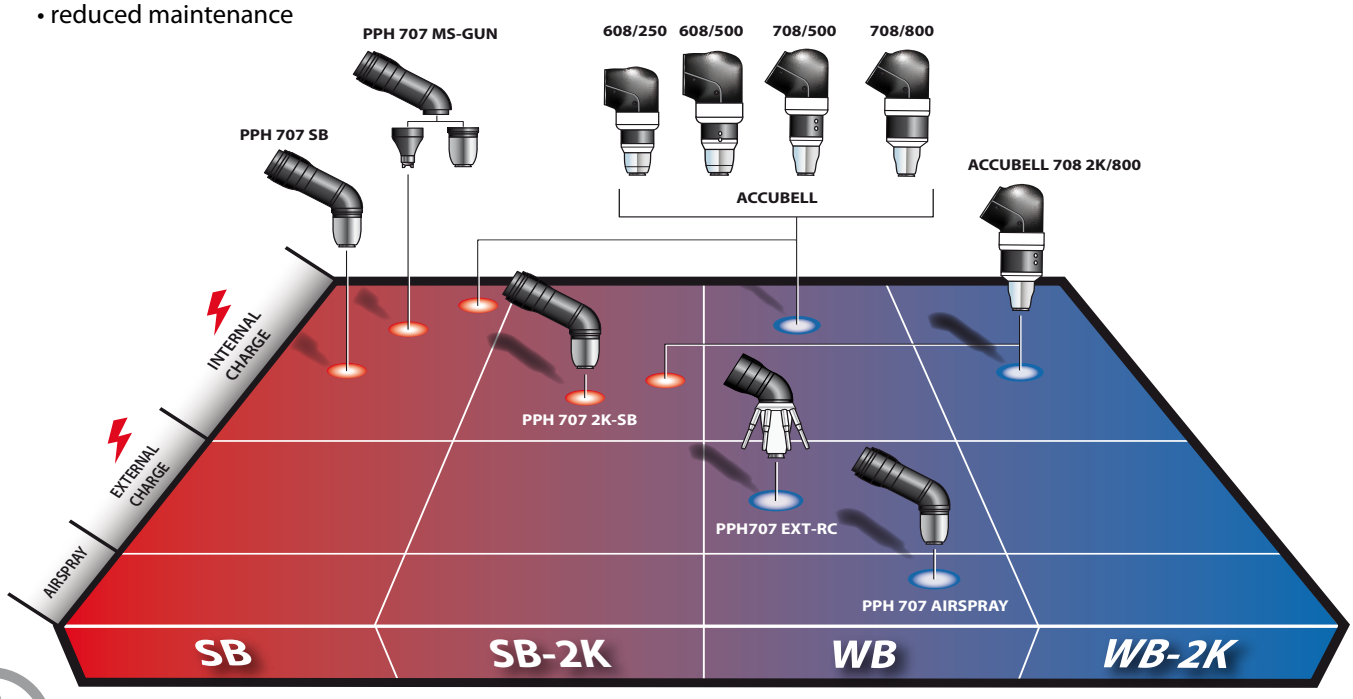
Electrical charge by external electrodes

:: Presentation of our range

The new Sames product line «Range 7» is very complete; it comprises three types of family:
The first one is named **PPH707**, dedicated to the electrostatic application of solvent based with internal charge paint or water based paint with external charge. The second one is named **ACCUBELL®**, dedicated to the application of water based paint with internal charge:
• better transfer efficiency,
• flexibility and application access
• quick rinsing and colour-change times = savings
• no product hosing inside the robot arm,
• reduced maintenance

The third family **ACCULOOK** is dedicated to solvent based paints. Its performances and components are similar to the ones of the PPH707, only the dimensions have been changed so that the TCP (tool centre point frame for robot paths) is the same as the one used for the ACCUBELL family. The paint line remains very flexible for an eventual upgrading from solvent based to water based paint application. ACCULOOK is then replaced, at the level of the wrist, by another sprayer (ACCUBELL®, internal charge or ACCULOOK 707-EXT, external charge) and the robot application paths remain the same.

> Range 7
- ***PPH 707 Family:***
  - PPH 707-SB
  - PPH 707-SB-2K
  - PPH 707-MS-GUN
  - PPH 707-EXT
- ***ACCULOOK Family:***
  - ACCULOOK 707-SB
  - ACCULOOK 707-EXT
- ***ACCUBELL® Family:***
  - ACCUBELL 608 (250cc)
  - ACCUBELL 708 (500cc)
  - ACCUBELL 708 (800cc)
  - ACCUBELL 708-2K (800cc)



• Consistency of the design of Range 7: numerous components are common

• Bell and air shroud technologies adaptable to all the sprayers

• Reduced stock and maintenance management

SB: Solvent based paint,
EXT: Charge by external electrodes,
250: Volume of loaded paint given in cm^3,
SB-2K: Two-component solvent based paint,
WB: Water based paint (non flammable or hard to set fire to),
WB-2K: Two-component water based paint (non flammable or hard to set fire to).

:: The new performances of the automotive paint market

> **HI-TE** is a new technology of air shroud **that allows variable patterns when spraying is in progress**, while guarantying the sturdiness of the pattern range. Numerous advantages are linked to this like the improvement of the transfer efficiency, colour match, application with high robot speeds, for a better finishing quality, etc. HI-TE enables the combination of the highest application quality together with unequalled transfer efficiency.

> **HI-TE** combines itself with the entire existing range of Sames bells (ex: 50-mm bell coupled to the air shroud named EC50 HI-TE).
This combination brings the highest possible transfer efficiency in the field of industrial paint application, with the best finishing quality.

HI-TE is compatible with all the sprayers of Range 7 for which the main advantages are:

- variation of the pattern during spraying,
- small or large pattern with low or high flow whichever the rotation speed may be,
- sustained high efficiency.

> A second advance that proposes numerous advantages to our customers is the «**EX 65**»; it is a paint bell with a curving rim that can be associated to the **HI-TE** air shroud. This solution is dedicated to Bell/Bell process in 2nd coating.

For other available bells sizes, please contact Sames.

Profits HI-TE Technology

- Excellent Colour match
- Regular and stable pattern for the whole range of variations of the paint spray
- Approved for high robot speeds
- More paint savings
- Shaping nose narrower and streamlined (at the level of air outlets) reducing pollution when spraying
- Only one air adjustment which facilitates its implementation
- Magnetic bell and linked advantages, easy maintenance

:: Configurations of the «Range 7»

PPH 707-SB (Internal charge)

PPH 707-SB-2K (2K mixed in the head)

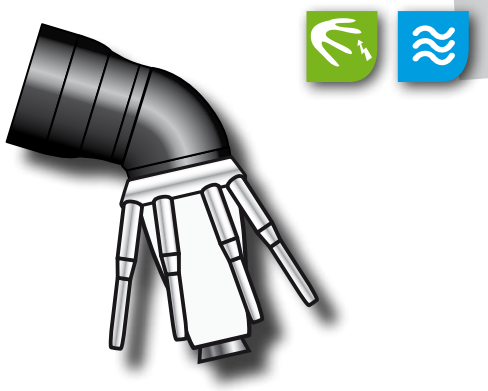
Paint	**solvent based**
High voltage	Electrical charge by direct contact (internal charge)
Process	Primer/Base/Clear
Applications	• **Interior** of the car bodies • Exterior of the car bodies • Large surfaces • **Bumpers**
Bells	EC35, EC50, EC65, EX65
Air shroud type:	• Vortex (EC35, 50 and 65) • Straight (EC 65) • Pairs of combined air holes : EC35 Hi-TE EC50 Hi-TE U & EC50 Hi-TE W EX65 Hi-TE
Turbine	HVT (1 525 849)
Injector	1.8 mm
Bend	60° (910 003 414)
Microvalves	Standard (1 507 375)
Nanovalves	Standard (1 510 004)
Base plate	(910003409) product fittings in 4/6mm
high voltage unit	UHT 157 (100kV/200µA) (910 002 870)
Low voltage connection	See page 110 § Wiring of the high voltage units

2-K solvent based
Electrical charge by direct contact (internal charge)
Clear
• **Interior** of the car bodies • Exterior of the car bodies • Large surfaces • **Bumpers**
EC35, EC50, EC65, EX65
• Vortex (EC35, 50 and 65) • Straight (EC 65) • Pairs of combined air holes : EC35 Hi-TE EC50 Hi-TE U & EC50 Hi-TE W EX65 Hi-TE
HVT (1 525 849)
Specific for 2K
60° Specific for 2K
Specific
Standard (1 510 004)
(910003409) product fittings in 4/6mm
UHT 157 (100kV/200µA) (910 002 870)
See page 110 § Wiring of the high voltage units

:: Configurations of the «Range 7»

PPH 707-MS-GUN (Multispray)

PPH 707-EXT (External charge)



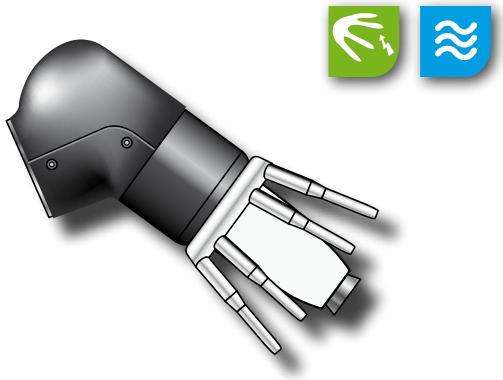
Paint	**solvent based**	**water based**
High voltage	Electrical charge by direct contact (internal charge)	Electrical charge by external electrodes
Process	Primer/Base/Clear	Primer/Base
Applications	• **Bumpers** • **Interior** of the car bodies • Exterior of the car bodies • Large surfaces	• **Exterior** of the car bodies • Large surfaces • Bumpers
Bells	EC35, EC50, EC65, EX65	EX65 EXT
Air shroud type:	• Vortex (EC35, 50 and 65) • Straight (EC 65) • Pairs of combined air holes : EC35 Hi-TE EC50 Hi-TE U & EC50 Hi-TE W EX65 Hi-TE	• Pairs of combined air holes : EX65 Hi-TE EXT
Turbine	HVT (1 525 849)	HVT (910 008 241)
Injector	1.8 mm	1.8 mm
Bend	60° - Bell (910 003 414) or specific for gun	60°
Microvalves	Standard (1 507 375)	Standard (1 507 375)
Nanovalves	Standard (1 510 004)	Standard (1 510 004)
Base plate	(910003409) product fittings in 4/6mm	(910003409) product fittings in 4/6mm
high voltage unit	UHT 157 (100kV/200µA) (910 002 870)	UHT 330 (85kV/500µA) (910 007 139)
Low voltage connection	See page 110 § Wiring of the high voltage units	See page 110 § Wiring of the high voltage units

:: Configurations of the «Range 7»

ACCULOOK 707-SB (Internal charge)

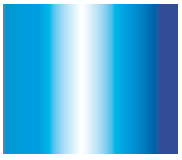
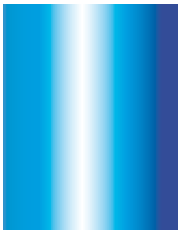
Paint	**solvent based**
High voltage	Electrical charge by direct contact (internal charge)
Process	Primer/Base/Clear
Applications	Same as ACCUBELL 708 (same TCP)
Applications	• **Exterior** of the car bodies • Large surfaces • Bumpers
Bells	EC35, EC50, EC65, EX65
Air shroud type:	• Vortex (EC35, 50 and 65) • Straight (EC 65) • Pairs of combined air holes : EC35 Hi-TE EC50 Hi-TE U & EC50 Hi-TE W EX65 Hi-TE
Turbine	HVT (1 525 849)
Injector	1.8 mm
Bend	60°
Microvalves	Standard (1 507 375)
Nanovalves	Standard (1 510 004)
Base plate	(910003409) product fittings in 4/6mm
high voltage unit	UHT 157 (100kV/200µA) (910 002 870)
Low voltage connection	See page 110 § Wiring of the high voltage units

ACCULOOK 707-EXT (External charge)



water based
Electrical charge by external electrodes
Primer/Base
Same as ACCUBELL 708 (same TCP)
• **Exterior** of the car bodies • Large surfaces • Bumpers
EX65 EXT
• Pairs of combined air holes : EX65 Hi-TE EXT
HVT (910 008 241)
1.8 mm
60°
Standard (1 507 375)
Standard (1 510 004)
(910003409) product fittings in 4/6mm
UHT 330 (85kV/500µA) (910 007 139)
See page 110 § Wiring of the high voltage units

:: Configurations of the «Range 7»

	ACCUBELL 608	ACCUBELL 708
		 
	250 cm³	500 cm³ / 800 cm³
		 
Turbine	TPAM S12 (45000 rpm)	HVT (85000 rpm)
Paint	Two independent paint circuits (grounded solvent and insulated water)	
		Two-component version
Bells	EC35, EC50 EC50 Hi-TE EX65 Hi-TE	EC35, EC50, EC65, EC80 EC35 Hi-TE, EC50HI-TE U & EC50 Hi-TE W EX65 Hi-TE

ACCUBELL 608 - 250cc
This version is dedicated to the application of the interiors of the car bodies.

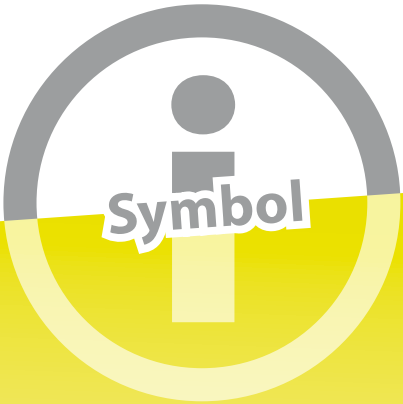
ACCUBELL 708 - 500cc
This version, the most widespread, is equipped with a reservoir that is big enough for one application on:
- private cars
- bumpers
- large surfaces
- line of average or high capacity

ACCUBELL 708 - 800cc
One of the main advantages of this system consists in reducing the number of robots on the lines thanks to the larger capacity of the built-in paint reservoir. It allows the application on:
- private cars
- bumpers
- line of very low capacity
- line of very low speed

Benefit from all the advantages thanks to the internal charge for the application of water based paints with ACCUBELL® solutions:

- High transfer efficiency
- Product savings
- High quality of finishing
- No paint hosing inside the robot arm
- Application on the interiors and exteriors with the same sprayer
- Reduced maintenance

Notes



Solvent based paint

Non flammable or hard to set fire water based paint

Two-component paint

Electrical charge by direct contact (internal charge)

Electrical charge by external electrodes

Automatic sprayers bells or guns

PPH 707-SB

PPH 707-MS-GUN

PPH 707-EXT

ACCULOOK 707-SB

ACCULOOK 707-EXT

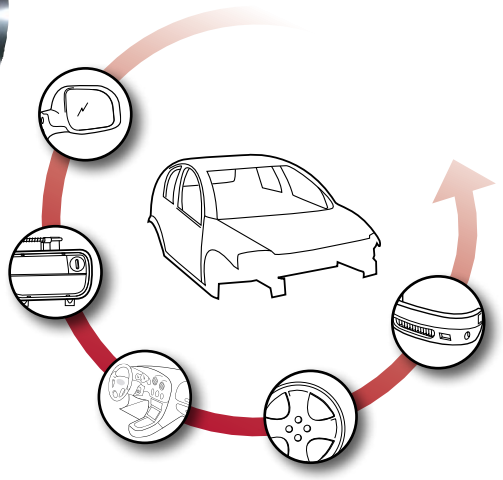
ACCUBELL 708-500cc & 800cc

ACCUBELL 708-2K-800cc

ACCUBELL 608-250cc

TRP 501 / 502

PPH 707-SB



PPH 707-SB is a sprayer dedicated to the electrostatic application with internal charge of **solvent based paint**.
It is equipped with the **high speed turbine** (HVT) with magnetic bell. "SB" index means that this type of sprayer is dedicated to solvent based paint application. The high speed allows a high rotation (up to 85 000 rpm):
• better atomization fineness,
• high paint flow

The level of finishing quality proposed by the PPH 707-SB guaranties a high quality. This tool will meet your requirements in terms of:

• spraying (primer, base, 2nd base, clear …)

• application aspect

• control of the V.O.C.

• reliability and simplification of the maintenance operations

• product saving

:: Field of application

PPH 707-SB is dedicated to the Automotive Industry and Tier 1 for solvent based application.

Which ever the product may be: primer, base, clear, it can be installed at any stage of an automotive paint line (car body exterior or interior), as well as on Tier 1 paint line (bumpers, car body parts).

PPH 707-SB can be built-in into any type of multi-axis robot.

:: Customers' benefits

> Sturdiness in production:

• The high voltage unit is of high power (100kV/200µA); it works in very severe conditions of application (dirt/ overspray, application inside cabins close to the ground potential…)

• The design of the magnetic air bearing turbine prevents the wear of the moving parts; there is no mechanical contact:
- low maintenance costs
- long service life

• Grounded paint circuits = no High Voltage inside the robot arm and wrist.

• A survey device of the bell called «Remote Bell Cup» allows the dynamic detection of the presence and correctly fitted bell.

> Easy maintenance:

The design of the PPH 707-SB has been optimized with the aim of reducing the maintenance operations at their maximum and to make the disassembly of the various components easier.

• Easy and quick disconnect of the sprayer in less than 10 sec.
• Quick disconnect High Voltage Unit.

• Quick access from the front face of the QD plate to the different components (UHT, fittings, coils ...).
• Retention-less outer Design (prevention of grains and drops).
• Special fittings with double tightness (radial + axial):
- No product retention = optimal rinsability
- No wear of the seals while running
- No restriction = no pressure drop

• Control of the assembly of the sprayer on the robot: «QD check» new concept detecting the correct tightening of the body on the base plate = avoids assembly errors.

• Pressure measurment made on Hi-TE air shroud which allows a readout in real time and permits to check presence of air = detects any possible obstruction or leackage.

> Application result:

The technology used (High Speed Turbine and Hi-Te air shroud) allows the combination of a really fine atomization of droplets and a good control of the paint spray.
The finishing quality meets the most severe criteria of flow and of D.O.I. (quality of reflection).

> Product saving:

The transfer efficiency is high; it is superior to the one for a standard application. The electrostatic paint application guaranties optimum transfer efficiency which ever the speed of motion the sprayer may be.

PPH 707-SB

- High flow up to 1000 cc
- Integrated coils circuits
- Two product circuit
- Approved for bell/bell process
- Excellent repeatability of the application adjustments
- Quick variation of the spray pattern with the combined air shroud «Hi-Te»
- No high voltage inside the robot bend
- Long service life turbine

> Wide choice for the bell types:

Several combinations of bells and Vortex air shrouds, directional air or HI-TE technology, are possible and allow spraying all sorts of paints and clears, while offering unequalled quality of aspect, a superior penetration and a better colour match.

- Narrower and streamlined shroud nose = Less sensitive to pollution.
- Easy adjustment: only one adjustment of the air shroud = Easily done.

> Colour change:
The cycle time is of:

• 10 seconds for a paint circuit
• 5 seconds for a double circuit configuration.

:: Advantages of the HVT: high voltage turbine

> HVT carries on the qualities of the PAM turbine and integrates all the latest improvements.
It allows a rotation without any mechanical friction, thus there is no wear and it ensures a long service life of the components: the bell is rotating on an "air cushion" principle.

> Quality of application is optimal with a large paint flow range (up to 1000 cc/min).
This allows our customers increasing their production rates, reducing the number of robots to paint a car body or also applying metallic base coat first, then a second base coat in bell/bell process.

> Turbine air consumption equivalent to the one of a standard turbine (PAM BTM preceding generation).

> Shock-resistant (that may occur upon a brutal air supply rupture).

> Repairable on site, thus allowing the customer to keep, cheaply, equipment that are always in a good state of work.

> Interchangeable components of the HVT, the maintenance parts can be independently repaired; they can be replaced in series and without having to be calibrated together.

Reverse Flush

• Ceaselessly innovating to integrate economical processes, Sames has developed «**Reverse Flush**»: The rinsing of the paint unit is carried out by the main supply system, allowing a quick and perfect cleaning; the customer is thus winning in terms of productivity.

• No possible high voltage back-streaming inside the dump circuit.

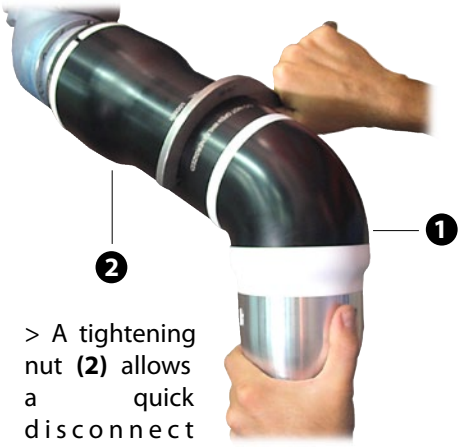
:: Description of the sprayer

• PPH 707-SB sprayer is equipped with a HVT turbine on which a magnetic bell is assembled. The bell rotation combined to the high voltage ensures:

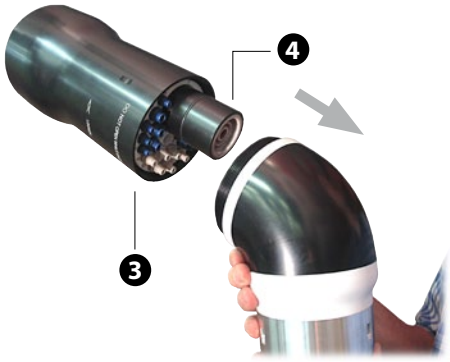
> a high level of productivity
> an homogeneous spraying.
> a regular paint spray.
> an optimal covering of the parts to be painted (the skirting-round effect allows a paint deposit behind the part).
> paint saving

• There is only one version of the PPH 707 SB sprayer; it is composed of the following elements:

> The one-piece sprayer body **(1)** ensures a total tightness at the level of the bend.
This very compact component integrates drive-nanovalves that are placed at the nearest of the bell. The paint and rinsing product losses are reduced as well as the colour-change time. Its specific design, retention-less, thoroughly eliminates any risk of grains or drops on the parts to be painted.

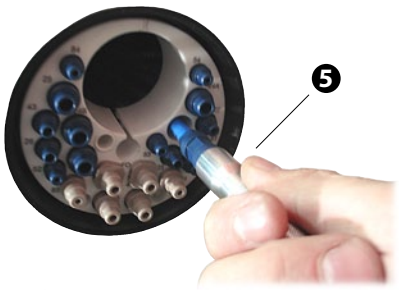


> A tightening nut **(2)** allows a quick disconnect (approx. 10 sec with only one key) and time savings for maintenance and control.
This very nut also ensures the function of protection cover of the sprayer. Access **(3)** to the different components is carried out without disassembling the sprayer from the robot arm.



> High voltage system integrated thanks to an «UHT 157» unit that can be manually disconnected **(4).**

> Connections **(5)** «airs/products» individually dismountable from the front.



> New turbine **(6)** «HVT» for bell **(7)** with magnetic hold

> Easy bell disassembly, with very simple tool, without disassembling the outer air shroud.
Placing the bell in position is made without any tool **(8)**. It is recommended to use gloves adapted to the mechanical protection.

> Double circuit without regulator with two « coil » hoses on each product input. It is possible to adapt different coil lengths (long coil for low paint resistivity and short one for high paint resistivity).

:: Technical characteristics

Weight	PPH 707-SB
Spare atomizer, without cable or hose	7 kg

Pneumatic supply	PPH 707-SB
Nano-valve drive air pressure	8 bar mini (120psi) - 10 bar max. (150psi)
Magnetic turbine bearing air pressure	5 mini (75psi) - 7 bar max. (105psi) from 130 to 180 L/min
Shaping air pressure	6 bar (90psi) recommended on manifold
Micro air pressure	0.5 mini (7,5psi) at 1 bar maxi. (15psi) from 20 L/min to 40 L/min
Drive air consumption	10 Nl/min.
Magnetic turbine bearing air consumption	125 Nl/min.
Shaping air consumption (with respect to air shroud and bell being used)	From 100 to 1000 Nl/min.
Turbine rotation air consumption	From 100 to 700 Nl/min.(1)
Safeguard air quantity	25 litres at 6 bar (90 psi)

(1): with respect to sprayed flow and rotation speed

Product supply	PPH 707-SB
Standard product supply pressure	6 (90psi) to 8 bar (120psi)
Maximum product pressure	10 bar (150psi)
Paint flow (depending on paint type)	30 to 1000 cc/min.(2) maxi.
Viscosity scale (for minimum results)	20 to 45 seconds FORD #4 Cup
Paint resistivity	> 3 MΩ.cm

(2): with a product density < 1.1 gr/cm3 and/or of the combination bell and air shroud being used

Performances	HVT
Rotation speed	15 to 85 000 rpm (upon diameter of bell cup used)
Application speed	up to 1200 mm/sec
Color change	**PPH 707-SB**
Paint consumption	25 cm^3 (paint circuit) & 25 cm^3 (pump circuit)
Rinsing product consumption	300 cm^3 (not included rinsing box)
Standard process time	10 sec (with REVERSE FLUSH)
Optimized process time	5 sec (with REVERSE FLUSH on circuit 1 & 2)
Same Color (head rinsing + bell cup)	**PPH 707-SB**
Time	6 sec.
Rinsing product consumption	50 cm^3
High Voltage	**UHT 157**
Voltage maxi.	100 kV
Current maxi.	200 µA

ATEX marking:

PPH 707 SB:

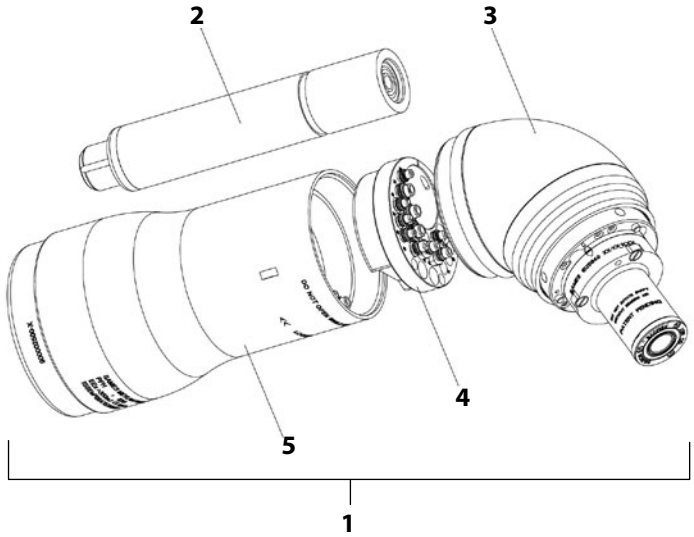
CE 0080 Ex II 2 G
EEx > 350 mJ
ISSeP05ATEX032X

GNM 200(3):

CE 0080 Ex II (2) GD
[EEx > 350 mJ]
ISSeP05ATEX032X
ISSeP06ATEX032X
ISSeP07ATEX001X

(3): This control module allows piloting the UHT 157. It is a device that is part of the configuration of the certified equipment and that contributes to its good working. It has to be installed into a non explosive area.

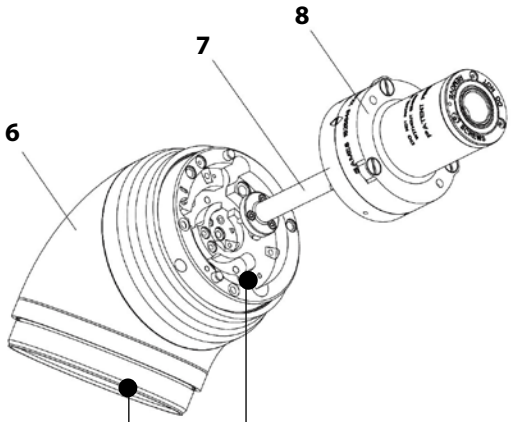
:: Atomizer



Complete atomizer with turbine.
Bell and air shroud set is not included.
Maintenance tools are not supplied with this reference.

Description		Mark	Reference
PPH 707-SB		1	910 004 013
	High voltage unit UHT 157	2	910 002 870
	Equipped complete bend	3	910 004 455
	Base plate PPH 707	4	910 003 409
	Rear support	5	910 004 014

Protection stretch cover 900 002 370



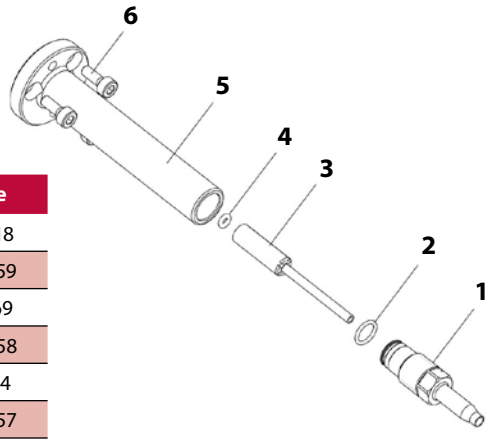
Complete bend with turbine.
Bell and air shroud set is not included.
Maintenance tools are not supplied with this reference.

Description		Mark	Reference
Complete bend		6 + 7 + 8	910 004 455
	Equipped spare bend	6	910 003 414
	Injector/injector support set	7	910 000 618
	Turbine HVT	8	1 525 849

O'rings kit base-plate side-wise 910 003 416

HVT turbine side-wise o'rings kit 910 003 415

:: Injector support

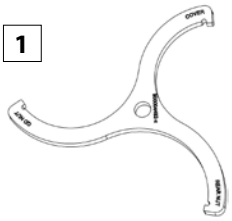


Description		Mark	Reference
Injector/injector support set			910 000 618
	Diffuser	1	900 000 159
	O'ring	2	J3S TKL 069
	Injector dia. 1.8mm	3	900 000 158
	O'ring	4	J3S TKL 014
	Injector support	5	900 000 157
	Screws (x3)	6	X4F VSY 066

:: Tools

Description	Mark		Reference
Assembly and disassembly tool for exterior shroud, rear nut and base-plate nut	1		900 004 492
Disassembly tool for magnetic bell type EC	2	ø 35mm	900 000 804
		ø 50mm	900 000 803
		ø 65mm	1 204 427
		ø 80mm	1 204 556
Nano-valve tool	3	disassembly	1 301 832
		assembly	1 403 498
Micro-valve tool	4	Disassembly/ assembly	1 303 689
Fitting assembly tool	5		1 313 955
Clipped fitting trapezoid tool	6		900 002 665
Injector disassembly tool	7		910 000 700

1



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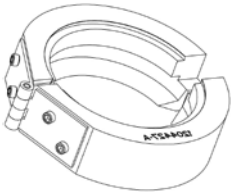

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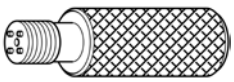

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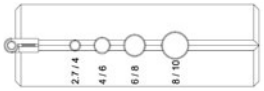
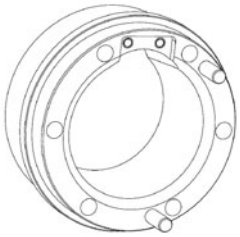


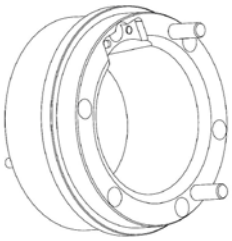
7

:: Adaptors for robots

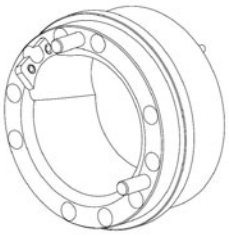
Description	Mark	Reference
Robotic adaptor for robot	P200-E/P250	910 003 410



Description	Mark	Reference
Robotic adaptor for robot	PX 2900	910 003 411



Description	Mark	Reference
Robotic adaptor for robot	IRB-5400	910 003 412



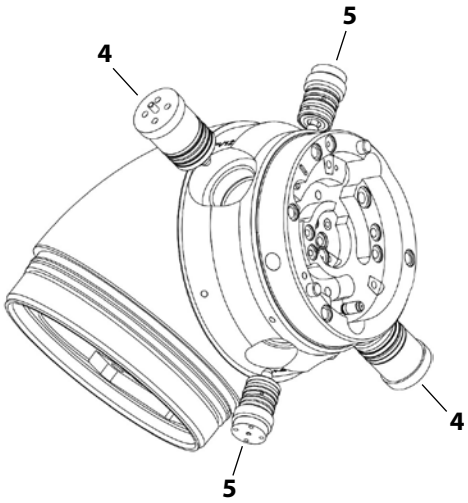
Please, contact Sames for any other type of robot.

:: Micro-valve and nano-valve

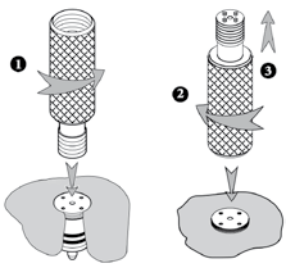
The valves are integrated within the bend of the atomizer, at the nearest of the head.

Description	Mark	pilotage	Reference
Micro-valve	4	Product A input	1 507 375
		Product B input	1 507 375
Nano-valve	5	Dump return circuit A	1 510 004
		Dump return circuit B	1 510 004
		Exterior bell rinsing	1 510 004

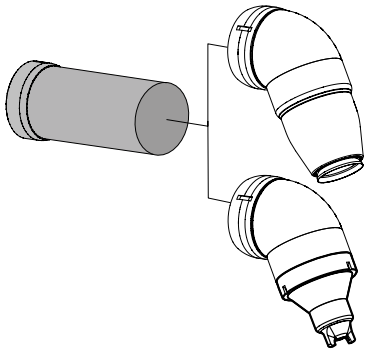
Sames drive-valves (due to their small bulk) can be placed inside the atomizer head next to the product outlet thus enabling product, rinsing solvent savings and reducing the colour-change time



With the help of the disassembly tool, unscrew (1) the valve (4 turns) in order to free the thread.
If the plug remains stuck when unscrewing and the valve remains in its housing, then carry out the disassembly in the following way: Place the disassembly tool up-side-down, screw (2) the tool on the micro-valve and completely remove (3) the micro-valve by carrying out a rotation.



PPH 707-MS-Gun



PPH 707-MS-GUN with manual tool change «multi-process» is mainly dedicated to Tier 1 paint lines. This allows switching quickly from a gun to a bell process and vice versa for solvent based paint application.

> A multipurpose tool:
This tool, belonging to Range 7 sprayers (PPH 707-SB), is composed of a common body integrating an high voltage cascade (UHT 157), the product and air circuits and is ended by a quick fixation nut on which can be fixed a sprayer head of bell type (PPH 707-SB) or a single-head gun.

Example: the application of a second base coat is generally carried out with an electrostatic gun but can also be carried out with a bell (paint saving).

> An upgradable spraying system:
MULTISPRAY makes the spraying process evolution easier, the same tool switching easily from a gun to a bell configuration. PPH 707-MSGUN allows validating «all electrostatic» and «bell for 2nd base coat» processes, with the aim of optimizing paint consumption. Mass production on a paint line can start with an electro-pneumatic gun, and then the operator can adapt a bell to carry out trials with the aim of changing the 2nd base coat application process. It can easily come back to the gun configuration and resume production up to the final application with bell; thus without disassembling the common body from the robot which does not change.

7 possible configurations:

1rst coat		2nd coat	
Bell	Gun	Bell	Gun
	*		*
	*		⚡
	⚡		*
	⚡		⚡
⚡			*
⚡			⚡
⚡		⚡	

* With electrostatics
⚡ Without electrostatics

Customers' benefits

- Validation of all the processes from outside the line by using only one set.
- Reduction of the time necessary to the validation of the new shapes, paints and colours.
- Reduction of the time for assembly/disassembly of configurations.
- Use of only one equipment: reduction of the number of spare parts and maintenance costs.
- Ideal for the validations of Bell/Gun on site.

Robotic sprayer for external electric charge of waterbased paint
PPH 707-EXT

PPH 707-EXT

The PPH 707-EXT external charge sprayer is dedicated to the application of waterbased materials. Its performances and components are the same than the PPH 707B - SB (dedicated to solvent paints); it is the benchmark in the area of automotive finishing with external charge thanks to its **Hi-TE technology.**

• Equipped with the new spraying system **EX 65 Hi-TE-EXT**, PPH 707-EXT allows all following advantages:
> High transfer efficiency in a BELL/BELL process
> Very high performance on colormatch
> Robust spray pattern
> Easy metallic paints application
> Easy application on exteriors of car bodies (waterbased primers and basecoats)
> Simple operation of Hi-TE system
> Approved for high paint flow at high tip speed

ATEX Marking:

PPH 707-EXT RC :	***UHT 330 EEx e :***	***GNM 200[(1)] :***
CE 0080 Ex II 2 G	Ex II 2 GD	CE 0080 Ex II (2) GD
EEx > 350 mJ	EEx e II	[EEx > 350 mJ]
ISSeP06ATEX032X	ISSeP01ATEX002U	ISSeP05ATEX032X
		ISSeP06ATEX032X
		ISSeP07ATEX001X

(1): This control module allows piloting the UHT330. It is a device that is part of the configuration of the certified equipment and that contributes to its good working. It has to be installed into a non explosive area.

:: Technical characteristics

Weight	**PPH 707-EXT**
Spare atomizer, without cable or hose	7.08 kg

Performances	**HVT**
Rotation speed	15 to 70 000 rpm
Application speed	up to 900 mm/sec
Color change	**PPH 707-EXT**
Paint consumption	25 cm^3 (paint circuit) & 25 cm^3 (pump circuit)
Rinsing product consumption	300 cm^3 (not included rinsing box)
Standard process time	10 sec (with REVERSE FLUSH)
Optimized process time	5 sec (with REVERSE FLUSH on circuit 1 & 2)
Same Color (head rinsing + bell cup)	**PPH 707-EXT**
Time	6 sec.
Rinsing product consumption	50 cm^3

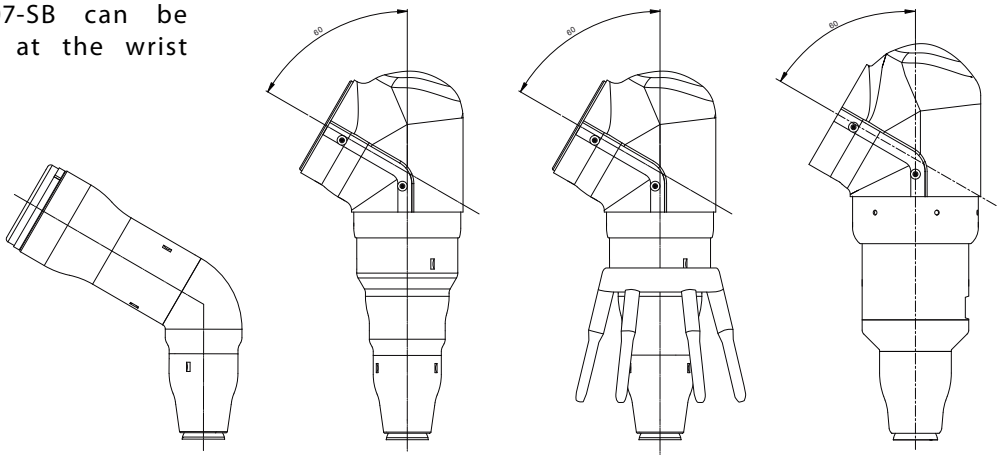
High Voltage	**UHT 330 EEx e**
Voltage maxi.	85 kV
Current maxi.	500 µA

ACCULOOK 707-SB

ACCULOOK 707-SB is an atomizer with electrostatic **internal charge** dedicated to the application of the **solvent based paints**.

It allows **upgrading** a solvent based paint line to water based paint application. ACCULOOK 707-SB can be then replaced at the wrist level (either with ACCUBELL® internal charge version or with ACCULOOK 707-EXT external charge version) while keeping existing similar application paths.

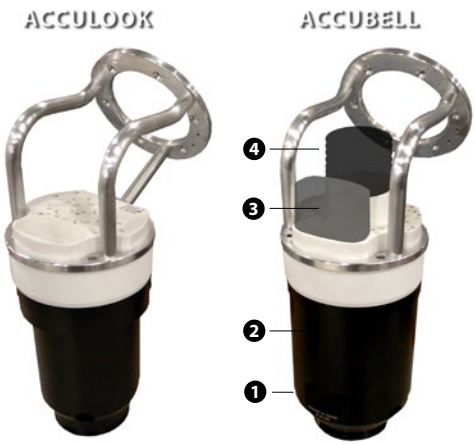
The **components** of the ACCULOOK 707-SB atomizer are **identical to** the ones of the **PPH707-SB**, only the dimensions have been adapted so that the **TCP** (tool centre point frame of the robot) is the same as for the **ACCUBELL 708 range**.



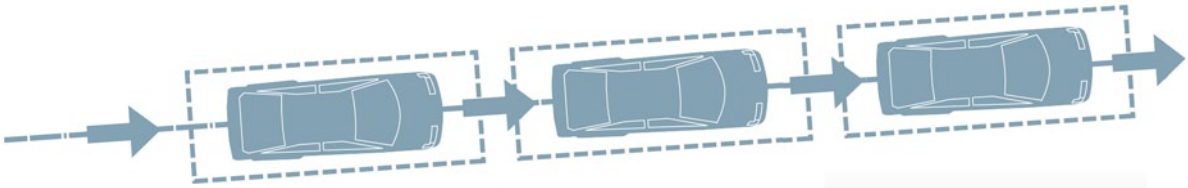
ACCULOOK'S main advantages:
- Performances and components similar to PPH 707-SB atomizer,
- Total compatibility with the spraying heads of the Range 7 (refer to chapter Bells and Air shrouds)
- Identical aspect as of the ACCUBELL range.

Components not-present on ACCULOOK:

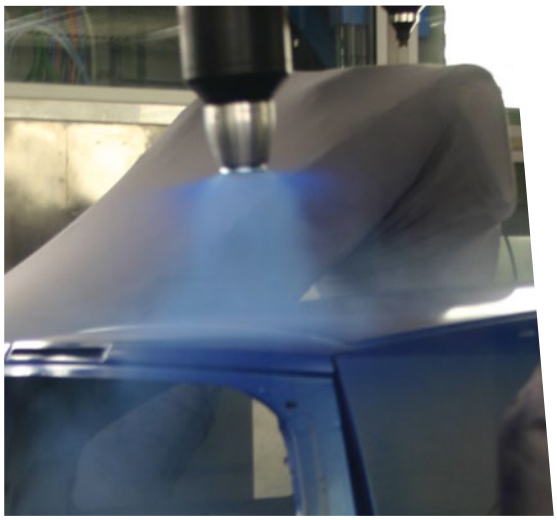
(1) «Docking nose» supply system,
(2) reservoir and piston,
(3) UHT 156,
(4) piston motor.



:: Example of upgrading of a paint line without modifying the paths



	Primer:	Base coats 1 & 2:	Clear coat:
Stage 1 >	**Solvent** ACCULOOK 707-SB	**Solvent** ACCULOOK 707-SB	**Solvent** PPH 707-SB
Stage 2 >	**Water based** ACCUBELL or ACCULOOK 707-EXT	**Water based** ACCUBELL or ACCULOOK 707-EXT	**Solvent** PPH 707-SB



:: Technical characteristics

Weight	ACCULOOK 707-SB
Spare atomizer, without cable or hose	7.5 kg

Pneumatic supply	ACCULOOK 707-SB
Nano-valve drive air pressure	8 bar mini (120psi) - 10 bar max. (150psi)
Magnetic turbine bearing air pressure	5mini (75psi) - 7 bar max. (105psi) from 130 to 180 L/min
Shaping air pressure	6 bar (90psi) recommended on manifold
Microphone air pressure	0.5 mini (7,5psi) at 1 bar maxi. (15psi) from 20 L/min to 40 L/min
Drive air consumption	10 Nl/min.
Magnetic turbine bearing air consumption	125 Nl/min.
Shaping air consumption (with respect to air shroud and bell being used)	From 100 to 1000 Nl/min.
Turbine rotation air consumption	From 100 to 700 Nl/min.(1)
Safeguard air quantity	25 litres at 6 bar (90 psi)

(1): with respect to sprayed flow and rotation speed

Product supply	ACCULOOK 707-SB
Standard product supply pressure	6 (90psi) to 8 bar (120psi)
Maximum product pressure	10 bar (150psi)
Paint flow (depending on paint type)	30 to 1000 cc/min.(2) maxi.
Viscosity scale (for minimum results)	20 to 45 seconds FORD #4 Cup
Paint resistivity	> 3 MΩ.cm (3)

(2): with a product density < 1.1 gr/cm3 and/or of the combination bell and air shroud being used, 3): Please, contact Sames Technologies in case of values inferior to 3 MΩ.cm

Performances	HVT
Rotation speed	15 to 85 000 rpm (upon diameter of bell cup used)
Application speed	up to 1200 mm/sec
Color change	**ACCULOOK 707-SB**
Paint consumption	25 cm^3 (paint circuit) & 25 cm^3 (pump circuit)
Rinsing product consumption	300 cm^3 (not included rinsing box)
Standard process time	10 sec (with REVERSE FLUSH)
Optimized process time	5 sec (with REVERSE FLUSH on circuit 1 & 2)
Same Color (head rinsing + bell cup)	**ACCULOOK 707-SB**
Time	6 sec.
Rinsing product consumption	50 cm^3
High Voltage	**UHT 157**
Voltage maxi.	100 kV
Current maxi.	200 µA

ATEX marking:

ACCULOOK 707-SB :

CE 0080 Ex II 2 G

EEx > 350 mJ
ISSeP05ATEX032X

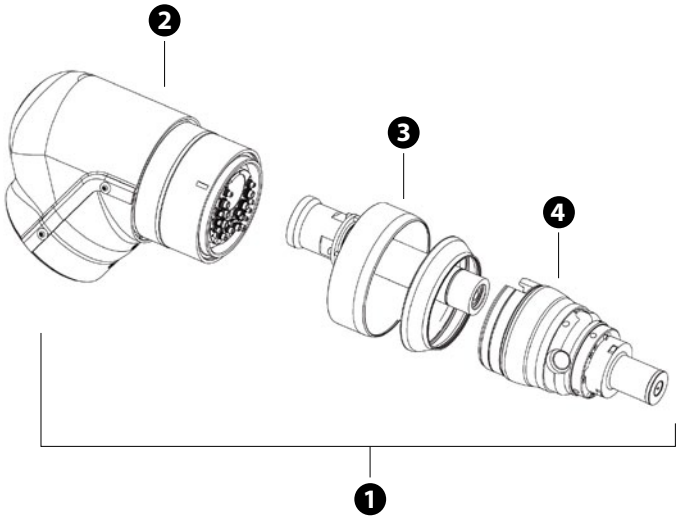
GNM 200(4) :

CE 0080 Ex II (2) GD

[EEx > 350 mJ]
ISSeP05ATEX032X
ISSeP06ATEX032X
ISSeP07ATEX001X

(4): This control module allows piloting the UHT 157. It is a device that is part of the configuration of the certified equipment and that contributes to its good working. It has to be installed into a non explosive area.

:: Atomizer



ACCULOOK 707-SB unit:
Bell and air shroud not included

Wrist	UHT Type	Description	Mark	Reference
Structure with wrist at 60°	UHT 157	ACCULOOK 707-SB	1	910 005 952
		Wrist unit	2	910 005 746
		UHT unit	3	910 005 743
		Complete body	4	910 005 624

mark 3: UHT157 kit + coil circuits + covers + coil connection dia.4x6mm

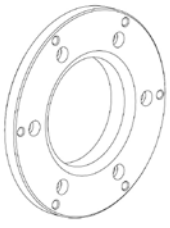
Protection stretch cover	900 002 370

:: Adaptors for robots

Description	Mark	Reference
Robotic adaptor for robot	P200-E/P250	910 000 952

Description	Mark	Reference
Robotic adaptor for robot	PX 2900	910 003 155

Description	Mark	Reference
Robotic adaptor for robot	IRB5400	910 007 256



Please, contact us for any other type of robot

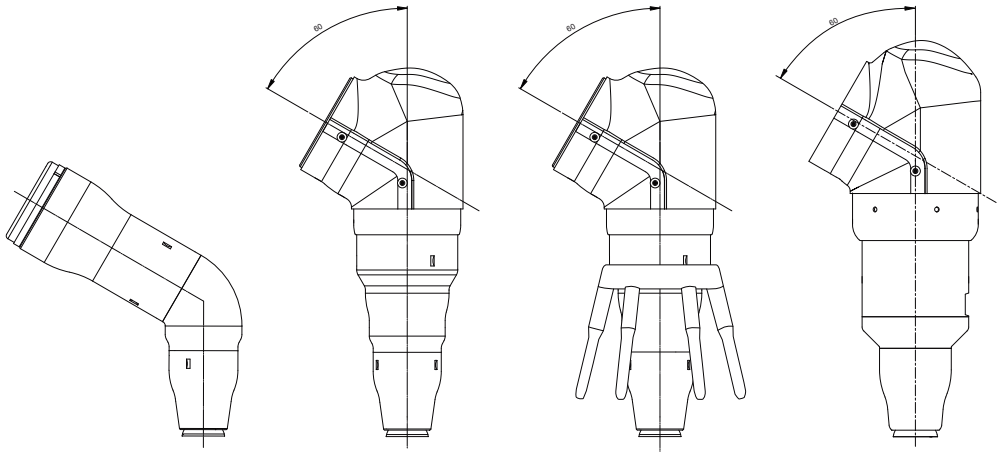
ACCULOOK 707-EXT

ACCULOOK 707-EXT is an electrostatic **external charge** atomizer dedicated to the **water based paint** application.

Its performances and components are **identical to** the ones of the **PPH707-SB**, the dimensions have been adapted so that the **TCP** (tool centre point frame of the robot) is the **same as** for the ACCULOOK 707-SB and the **ACCUBELL 708** range.

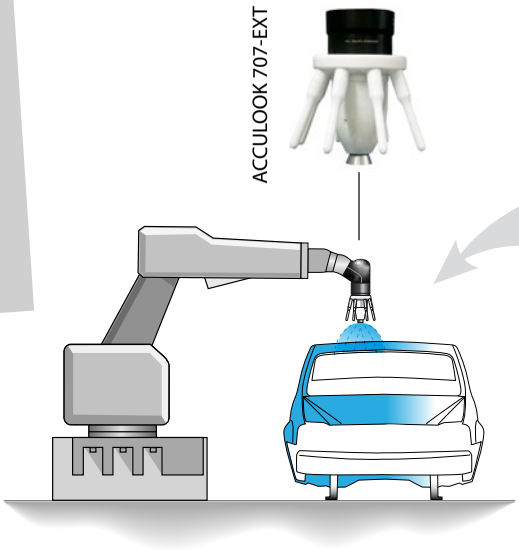
> Only equipped with the bell and air shroud **EX65 Hi-TE EXT** (refer to chapter Bell and air shrouds), it is exclusively dedicated to:

- the application of the car body exteriors
- the water based primers and base coats

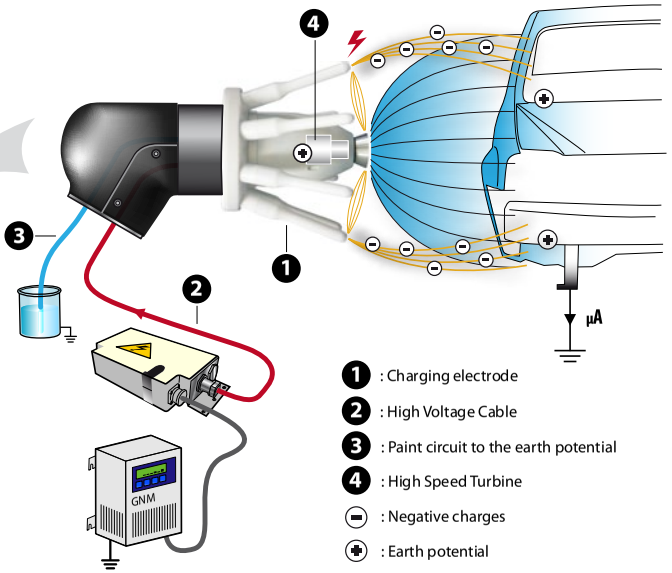


PPH 707-SB *ACCULOOK 707-SB* *ACCULOOK 707-EXT* *ACCUBELL 708*

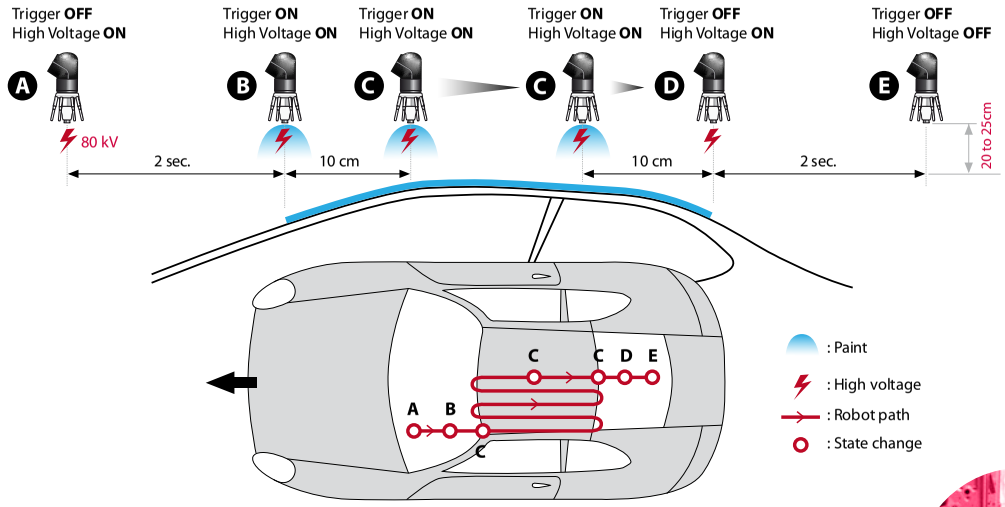
External charge Application
Waterborne paint



External charge principle: Corona charge



On - OFF trigger management



Recommendations

Spraying:

> Only spray in front of a grounded target.
> Never spray out of the car body. Do not spray when running a ghost.
> Trigger point has to be approx. at 10 cm before and the surface to be coated.
> Set 20 to 25 cm spraying distance. (distance between bell cup edge and target)
> High voltage must be ON at least 2 sec before triggering ON and must remain on at least 2 sec after triggering OFF.
Do not switch high voltage off during short production stop.

Color changing:

> Color change is a frequent source of applicator contamination and same care has to be taken as when spraying. Set high voltage ON and spray in front of a grounded target (the grid by ex.). Always delay paint spray from at least 2 sec after HV is ON. And leave HV ON for at least 2 sec after paint trigger is OFF.

Cleaning:

> Keep fingers and cover clean and dry.

General:

> Stable booth conditions 23°C ±3°C, 65% ±5% relative humidity, 0,3m/sec to ±0,5m/s down draft.
> High voltage 60 kV to 85 kV. Typical 80 kV
> Current consumption when spraying approx 300µA to 500µA.
> Tip speed up to 900 mm/sec

SAMES Technologies reserves the right to modify their units, together with characteristics, equipment and accessories, without prior notice.

Solutions for liquid paint application
Robotic sprayer for water based paint equipped with electrostatic external charge
ACCULOOK 707-EXT

:: Technical characteristics

Weight	ACCULOOK 707-EXT
Spare atomizer, without cable or hose	11.6 kg

Pneumatic supply	ACCULOOK 707-EXT
Nano-valve drive air pressure	8 bar mini (120psi) - 10 bar max. (150psi)
Magnetic turbine bearing air pressure	5 mini (75psi) - 7 bar max. (105psi) from 130 to 180 L/min
Shaping air pressure	6 bar (90psi) recommended on manifold
Microphone air pressure	0.5 mini (7,5psi) at 1 bar maxi. (15psi) from 20 L/min to 40 L/min
Drive air consumption	10 Nl/min.
Magnetic turbine bearing air consumption	125 Nl/min.
Shaping air consumption: 1 and 2	From 250 to 1000 Nl/min.
Turbine rotation air consumption	From 100 to 700 Nl/min.(1)
Safeguard air quantity	25 litres at 6 bar (90 psi)

(1): selon le débit pulvérisé et la vitesse de rotation

Product supply	ACCULOOK 707-EXT
Standard product supply pressure	6 (90psi) to 8 bar (120psi)
Maximum product pressure	10 bar (150psi)
Paint flow (depending on paint type)	100 to 700 cc/min. maxi. (2)
Viscosity scale (for minimum results)	20 to 45 seconds FORD #4 Cup

(2): with a product density < 1.1 gr/cm3 and/or of the combination bell and air shroud being used

Performances	HVT
Rotation speed	15 to 70 000 rpm
Application speed	up to 900 mm/sec
Color change	**ACCULOOK 707-EXT**
Paint consumption	25 cm^3 (paint circuit) & 25 cm^3 (pump circuit)
Rinsing product consumption	300 cm^3 (not included rinsing box)
Standard process time	10 sec (with REVERSE FLUSH)
Optimized process time	5 sec (with REVERSE FLUSH on circuit 1 & 2)
Same Color (head rinsing + bell cup)	**ACCULOOK 707-EXT**
Time	6 sec.
Rinsing product consumption	50 cm^3

High Voltage	UHT 330 EEx e
Voltage maxi.	85 kV
Current maxi.	500 µA

ATEX marking:

ACCULOOK 707-EXT :

CE 0080 Ex II 2 G
EEx > 350 mJ
ISSeP06ATEX032X

UHT 330 EEx e :

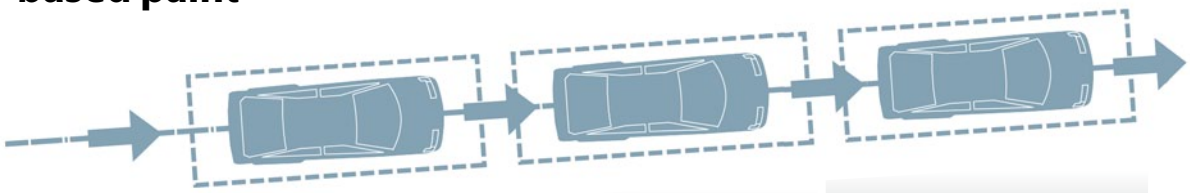
Ex II 2 GD
EEx e II
ISSeP01ATEX002U

GNM 200(3) :

CE 0080 Ex II (2) GD
[EEx > 350 mJ]
ISSeP05ATEX032X
ISSeP06ATEX032X
ISSeP07ATEX001X

(3): This control module allows piloting the UHT 330. It is a combined device that is part of the configuration of the certified equipment and that contributes to its good working. It has to be installed into a non explosive area.

:: Example of the upgrading of a paint line from solvent to water based paint

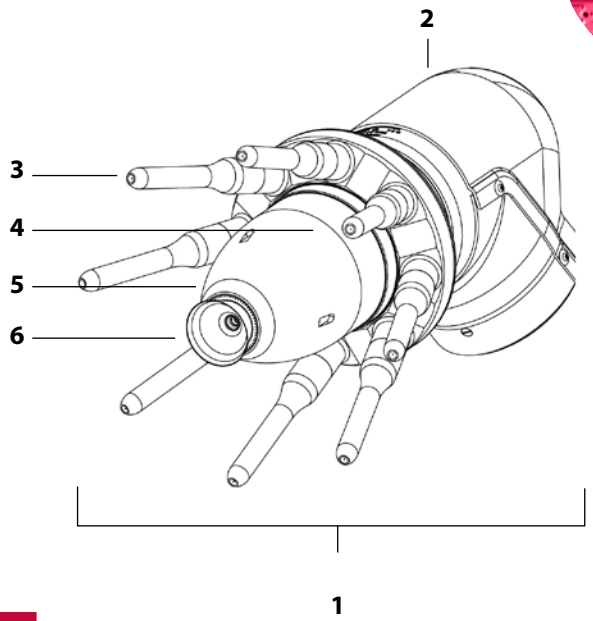


	Primer:	Base coats 1 & 2:	Clear coat:	
Stage 1 >	**Solvent** ACCULOOK 707-SB	**Solvent** ACCULOOK 707-SB	**Solvent** PPH 707-SB	
Stage 2 >	**Water based** (external charge) ACCULOOK 707-EXT	**Water based** (external charge) ACCULOOK 707-EXT	**Solvent** PPH 707-SB	
Stage 3 >	**Water based** (internal charge) ACCUBELL	**Water based** (internal charge) ACCUBELL	Solvent PPH 707-SB	Water based ACCUBELL

:: Atomizer

Complete atomizer with turbine.
Bell and air shroud set is included.
Maintenance tools are not supplied with this reference

Description	Mark	Reference
ACCULOOK 707-EXT	1	910 006 937
ACCULOOK 707 wrist	2	910 005 746
ACCULOOK 707 external charge kit	3	910 006 936
ACCULOOK 707 body equipped with HVT	4	910 005 624
Air shroud unit	5	910 006 820
ø65 bell unit	6	910 004 615
Protection stretch cover		900 002 370

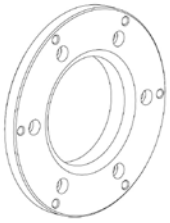


:: Adaptors for robots

Description	Mark	Reference
Robotic adaptor for robot	P200-E/P250	910 000 952

Description	Mark	Reference
Robotic adaptor for robot	PX 2900	910 003 155

Description	Mark	Reference
Robotic adaptor for robot	IRB5400	910 007 256



Please, contact us for any other type of robot.

ACCUBELL 708 - 500cc & 800cc

ACCUBELL® 708 is an atomizer dedicated to the electrostatic **water based paint** application with **internal charge**.

The atomizer integrates an **insulated** paint **reservoir** that allows:
- loading the exact necessary paint quantity,
- applying the high voltage to the paint in internal charge (better efficiency),
- freeing oneself from paint hosing inside the robot arm and wrist.

Between each part to be painted, the atomizer connects itself to a **filling** station called «Docking» to be rinsed and supplied with the **necessary paint** for the next part:
- great choice of possible colours,
- quick colour-change,
- reduced use of rinsing product.

ACCUBELL® also offers application solution for **solvent based paints** thanks to a **second circuit**, independent from the reservoir. On top of an easy application of the water based paints, the ACCUBELL® range thus offers a mixed solution (solvent/water).

ACCUBELL 708 - 500cc
This most common version integrates a reservoir with a big enough size for the application on:
- private cars
- bumpers
- large surfaces
- line of average or high capacity

ACCUBELL 708 - 800cc
One of the main advantages of this system consists in reducing the number of robots on the lines thanks to the larger capacity of the built-in paint reservoir. It allows the application on:
- private cars
- bumpers
- lines of very low capacity
- lines of very low speed

ACCUBELL 708-500cc, 1st base coat, water based paint on exterior car body.

:: Customers' benefits

> Perfection and flexibility of the application:
Great freedom of parameter setting:
• No constraints in relative speed,
• Improved access and paths.
The technology used (rotary bell) allows combining a really fine atomization of the droplets and a good control of the paint spray. The finishing quality meets the most severe criteria of flow and of D.O.I. (quality of reflection).
• Regular thicknesses and possibility to apply thick coats in one path.
• ACCUBELL allows working equally on the exterior or the interior surfaces with the same bell, just by making the size of the paint spray vary.

> Improved transfer efficiency, reduced emissions of volatile organic components (V.O.C.):
• Electrostatic application of water based products. The electrostatic application by direct contact (internal charge) allows reaching very high transfer efficiency: up to 90 %, thanks to the performances of the ACCUBELL, combined with the different types of bells and air shrouds.
• Optimal covering of the parts to be painted.

> Reduced operating costs:
• Less fog by controlling the spray pattern and accuracy of the robotic application = better transfer efficiency.
• Accurate filling of the necessary paint quantity (+/- 1cc).
• Very small product loss upon colour change.
• Reduction of the paint consumption, of the suppression of the booth sludge and water treatment costs.

> Reduced maintenance costs:
• No product hosing or high voltage cable inside the robot arm or inside the application booth.
• Direct filling: no handling of spare reservoir.
• Quick disconnection of the complete atomizer or of the turbine/bell unit.
• No more flow measure with a graduated test tube.

> Accurate control of the paint flow:
• Accurate dosing of the paint when filling and spraying, evenness of the applied coat.
• Quick response time for set values variations.

> Internal concept:
• Even more reduced rinsing/filling times compared to preceding generation, thus a reduction of the colour change time (ex: 15sec for a 500cc rinsing/filling).

> Insulation of the product unit:
• An insulated reservoir is assembled on to the robot; thus it is not crossed by neither paint hosing, nor high voltage cable.
• The service life and the availability of the system are thus greatly increased.

• «Color match» achievement in Bell/Bell process and for metallic base coats application

• Quick variation of the spray pattern with combined «HI-TE» air shroud

• No product hosing inside the robot arms and 7th-axis cat-tracks.

• Quick rinsing and colour-change times = savings

• Excellent repetitiveness of the application adjustments

> High speed turbine:
HVT perpetrates the qualities of the PAM BTM turbines and presents all the latest improvements. It allows a rotation free of mechanical friction, thus free of wear, and ensures a long service life of the components.

• The ACCUBELL®, equipped with the HVT, enables our customers to increase their production rates, reducing the number of robots to paint a car body, and also to apply metallic base in first coat and second base coat with "bell/bell" process.

• Air turbine consumption equivalent to conventional turbine (PAM BTM preceding generation).

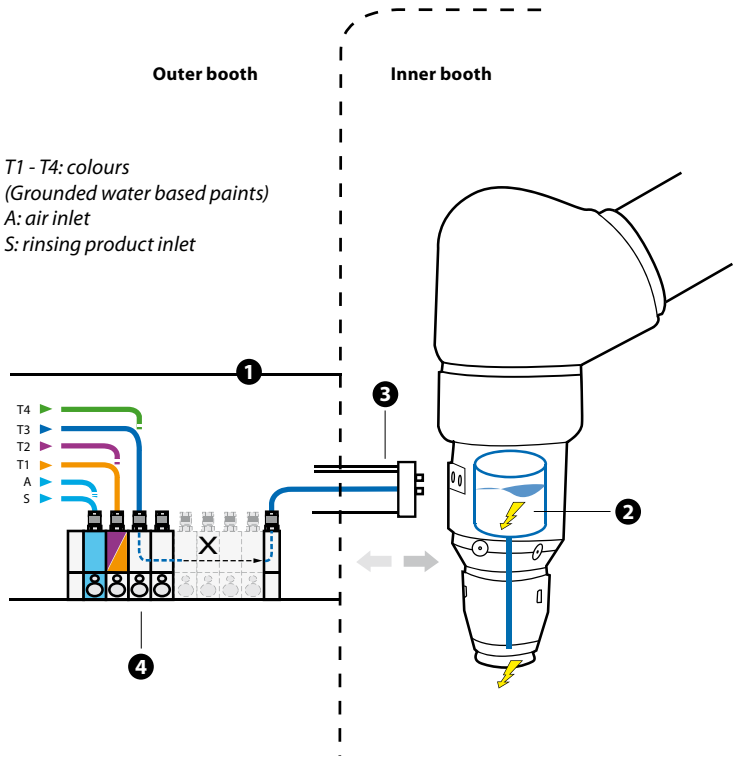
• Shock-resistant (that may occur upon a brutal air supply rupture).
• Repairable on site, thus allowing the customer to keep, cheaply, equipment that are always in a good state of work.

:: Working description

The ACCUBELL system enables to fill 500 or 800 cm3 of paint inside the atomizer body.

The High Voltage will be applied once the atomizer is disconnected from the "Docking" station **(3)**.

The preparation of the water based paint is thus easier; the high voltage is applied to the entire insulated paint reservoir **(2)** and separately from the paint circuit **(4)**. The paint unit can be placed outside the booth, thus there is **no product hosing inside the robot arm**. Risks of breakdown are then reduced and maintenance made much easier.



> Simplified description of the process:

The process defines the necessary quantity of paint with respect to the colour and type of part to be coated. The robot positions the ACCUBELL atomizer to connect it onto the docking station **(1)**. The atomizer cleaning cycle starts and the necessary quantity of paint is filled into its reservoir **(2)**.

The connection at the level of the atomizer is rinsed. The docking block «Docking» **(3)** is disconnected from the atomizer and the robot is ready to work.

The next colour set-value is transmitted to the colour change block **(4)** in order to prepare the next docking for the rinsing/filling.

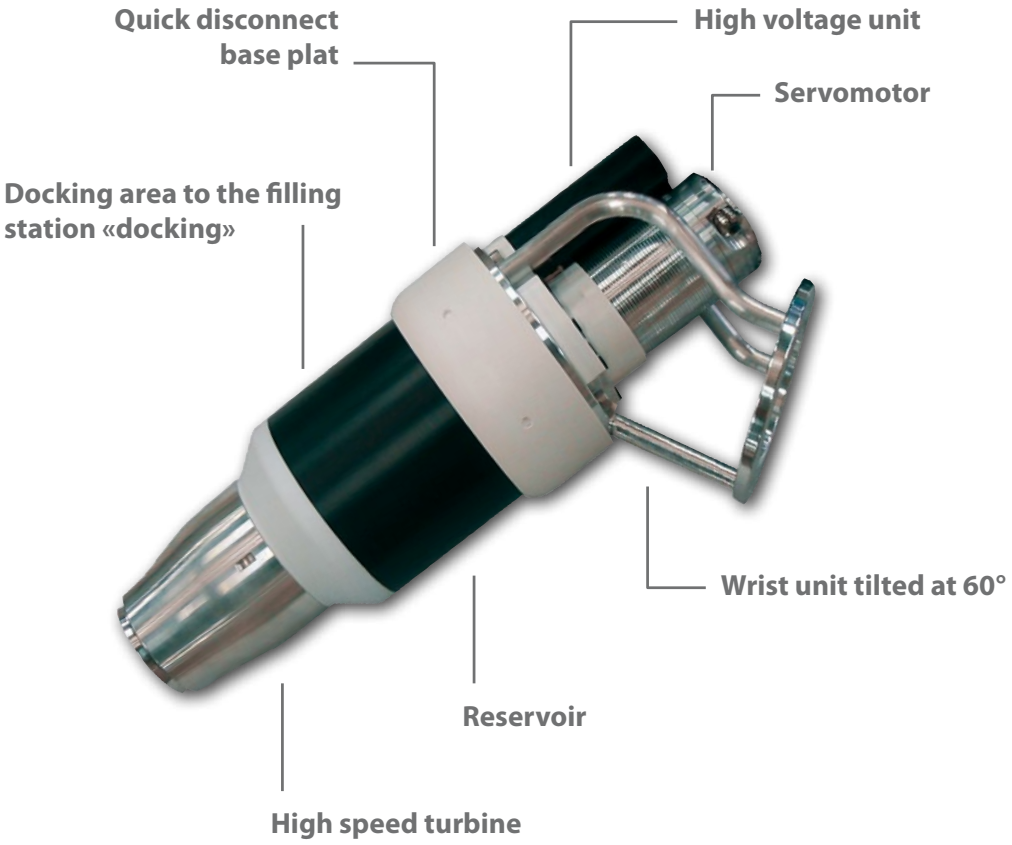
ACCUBELL® 708

- Very high reliability
- Very high flexibility (access, paths…)
- Easy-to-use appliance and not too much preventive maintenance
- Optimized rinsing:

- The liner of the reservoir is equipped with a bottom that completely prevents retention areas; cleaning is made easier; rinsing product quantity is reduced and the cleaning cycle is shorter.

Wall-mounted docking stations for 7-axis robots

:: Design



ATEX marking:

ACCUBELL:

CE 0080 Ex II 2 G
EEx > 350 mJ
ISSeP05ATEX032X

GNM 200[1]:

CE 0080 Ex II (2) GD
[EEx > 350 mJ]
ISSeP05ATEX032X
ISSeP06ATEX032X
ISSeP07ATEX001X

(1): This control module allows piloting the UHT 156. It is a combined device; it is part of the configuration of the certified equipment and contributes to its good working. It is installed into a non explosive area.

UHT 156 EEx e:

Ex II 2 G
EEx e II
ISSeP00ATEX002U

UHT 156 EEx m:

Ex II 2 G
EEx m II
ISSeP01ATEX008U

Servomotor:

Ex II 2 G
Ex px II T6

:: Technical characteristics

Weight	ACCUBELL 708 WB/SB, 500 cc	ACCUBELL 708 WB/SB, 800 cc
Atomizer with bell, air shroud and wrist base plate (without any cable or hosing and with empty reservoir)	12.4 kg	14.9 kg

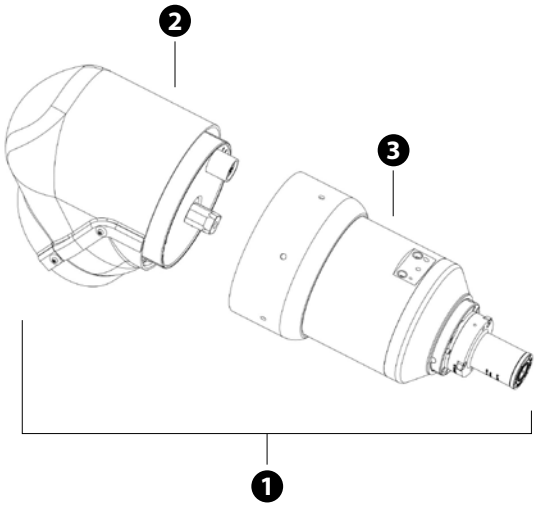
Pneumatic supply	ACCUBELL 708 WB/SB, 500 cc & 800cc
Nano-valve drive air pressure	8.5 mini (127,5psi) - 10 bar max. (150psi)
Magnetic bearing air pressure	5 mini (75psi) - 7 bar max. (105psi) from 130 to 180 L/min
Microphone air pressure	0.5 mini (7,5psi) at 1 bar maxi. (15psi) from 20 L/min to 40 L/min
Drive air consumption	10 L/min.
Magnetic bearing air consumption	125 L/min.
Shaping air consumption (with respect to air shroud and bell being used)	From 100 to 1000 L/min.
Safeguard air quantity	25 litres at 6 bar (90psi)
Rotation speed	15 000 to 85 000 rpm (upon diameter of bell cup used)

Product supply	ACCUBELL 708 WB/SB, 500 cc & 800cc
Normal product supply unit	5 (75psi) to 10 bar (150psi)
Paint flow (with respect to type of paint)	50 to 500 cc/min max.
	The flow can reach up to 1000cc/min on condition that the application quality is satisfying, with respect to the type and product density to be applied.
Viscosity scale (for optimum results)	20 to 45 seconds FORD #4 Cup

High voltage	UHT 156 EEx e
Voltage maxi. (kV)	90
Current maxi. (µA)	100

Performances	ACCUBELL 708 WB/SB, 500 cc	ACCUBELL 708 WB/SB, 800cc
Reservoir capacity	500 cm3	800 cm3
Accurate reservoir filling	+/- 1cc	
Accurate flow regulation	+/- 1 % of the requested set-value	
Response time for the change of start set-value	100 ms	
Color change	**ACCUBELL 708 WB/SB, 500 cc & 800 cc**	
Paint consumption	28 cm^3 for 14 colors	
Rinsing product consumption	250 cm^3 (not included rinsing box)	
Color change time (before filling the paint tank)	10 s.	
	+ 1s. for 50 cc filled (under 6 bar dynamic minimum, at 3 l/min with available flow)	
Total color changing time	20 s. for 500 cc filled	26 s. for 800 cc filled
Same Color (head rinsing + bell cup)	**ACCUBELL 708 WB/SB, 500 cc & 800 cc**	
Paint consumption	6 cm^3	
Rinsing product consumption	70 cm^3	
Color change time (before filling the paint tank)	5 s.	
	+ 1s. for 50 cc filled (under 6 bar dynamic minimum, at 3 l/min with available flow)	
Total color changing time	15 s. for 500 cc filled	21 s. for 800 cc filled

:: Atomizer



ACCUBELL 708 WB/SB, **500cc** unit:
Bell and air shroud unit not included

Wrist	UHT Type	Description	Mark	Reference
Structure with wrist at 60°	UHT 156 EEx e	ACCUBELL WB/SB, 500cc	1	910 001 123
		Wrist unit	2	910 000 949
		Atomizer	3	910 001 122

UHT 156 EEx e: High voltage unit of which low voltage cable is with quick disconnect.
Nano-valve: orange indicator compatible with water or solvent based paints.

ACCUBELL 708 WB/SB, **800cc** unit:
Bell and air shroud unit not included

Wrist	UHT Type	Description	Mark	Reference
Structure with wrist at 60°	UHT 156 EEx e	ACCUBELL WB/SB, 800cc	1	910 001 742
		Wrist unit	2	910 001 391
		Atomizer	3	910 001 743

UHT 156 EEx e: High voltage unit of which low voltage cable is with quick disconnect.
Nano-valve: orange indicator compatible with water or solvent based paints.

ACCUBELL 708 - 2K / 800cc

The solution for the application of **two-component water based paints** is composed of a standard atomizer ACCUBELL® 708 of 800-cm3 capacity and of an accurate catalyst supply, in order to transport the product up to the static blender built-in into the sprayer-head.

The catalyst supply (ancillary reservoir) is located inside the robot arm; it enables the accurate control of the ratio of catalyst injected into the base of two-component paint (clear, primer).

:: Process

- ACCUBELL® technology, simple and modular
- Holds the latest technological advances in 2-K
- Validity with the two main paint manufacturers
- Exclusive solution with 2-k external charge bell
- Possible variation of mixing ratio (from 3 to 30 %)
- Really small volume of mixed products (<1,5cc)

:: Characteristics

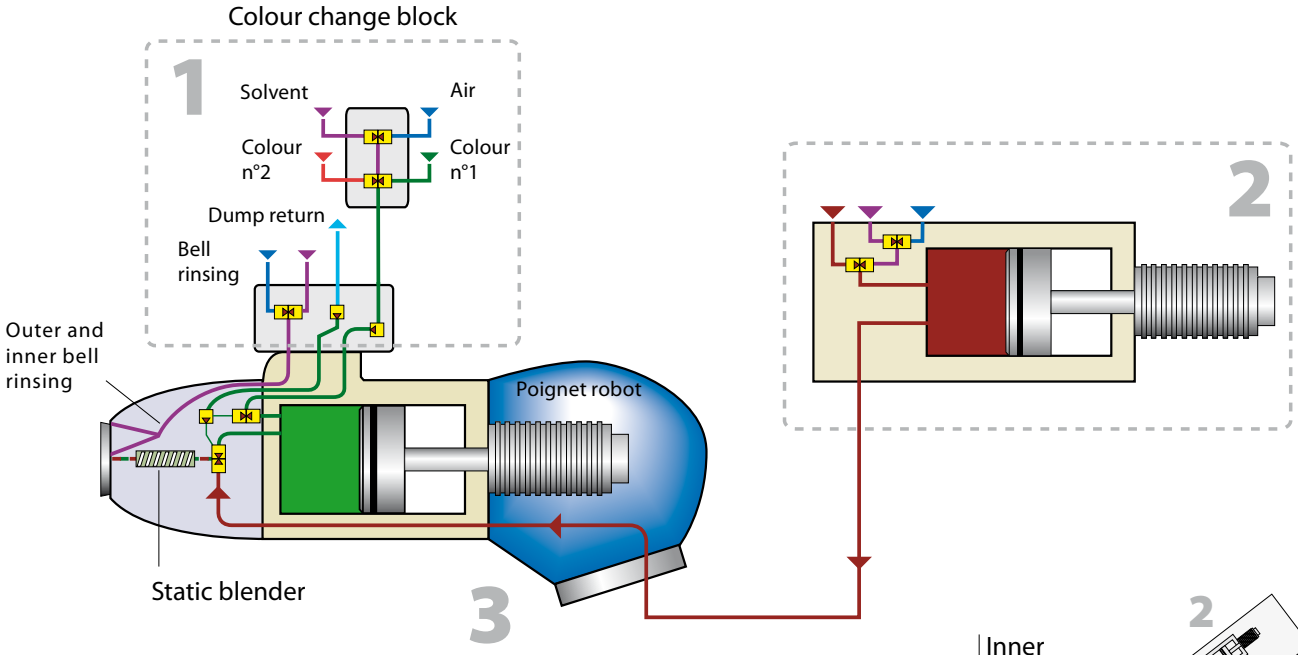
- Capacity of the servo-reservoir: 500cc
- Automatic circulation of mezamol (protection oil) above the piston preventing contact of the catalyst with air humidity
- Built-in micro-valve at the level of the reservoir outlet
- Short response time for ON/OFF trigger (100 msec)
- Accurate flow control
- Multiple catalysts or possible activators

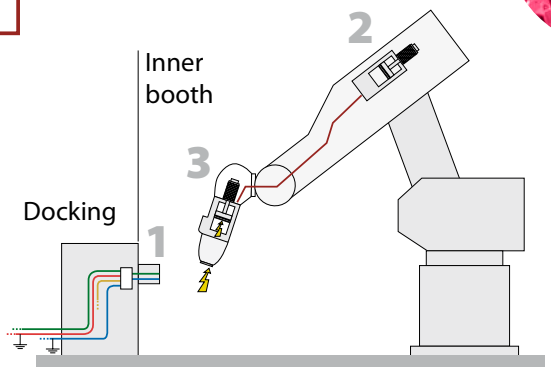
:: Maintenance advantages

- Standard piston and liner (Range 7)
- High level of accuracy for low and big flows
- Static blender assembled after the bell, the cartridge system is easily interchangeable
- No 2-K paint mixed into the atomizer reservoir
- Easy-to-rinse 2-K circuit
- Removable and interchangeable stainless steel valve block
- 2-K product specific design, cleaning possible even for the most difficult cases

Color change	
Time	13 s. + 1s. for 50 cc filled (under 6 bar dynamic minimum, at 3 l/min with available flow)
Paint consumption	30 cm^3 for 14 colors
	1 cm^3 hardener (single hardener)
Rinsing product consumption	300 cm^3 (not included rinsing box)
Same Color (head rinsing + bell cup)	
Time	6 s. + 1s. for 50 cc filled (under 6 bar dynamic minimum, at 3 l/min with available flow)
Paint consumption	6 cm^3
Rinsing product consumption	100 cm^3

:: Diagram





- Air
- Rinsing product
- Catalyst

1 Docking system «Docking»:
Paint supply, colour selection and atomizer rinsing

2 Catalyst supply up to the atomizer. Catalyst resistivity > 6 MΩ.cm
(rinsing of the circuit and reservoir)

3 ACCUBELL 708-2K / 800cc atomizer
(insulated paint reservoir, products mixing and high voltage applied)

ACCUBELL 708-2K

• ACCUBELL 2K's main advantage is to reduce the mixed product in progress and to guaranty a very high accuracy of product mixing.

ACCUBELL 608 - 250cc

ACCUBELL® 608-250 atomizer is dedicated to the electrostatic application of **water based paints** in internal charge.

This version is particularly **dedicated** to the application on the car body **interiors**, the **cut-ins** and the rocker panels.

Indeed, its reduced dimensions make it the perfect tool in terms of access and of paths definition in limited areas.

:: Customers' benefits

> Perfection and flexibility of application:
Great freedom of parameter setting:
• No constraints in relative speed,
• Improved access and paths.
The technology used (rotary bell) allows combining a really fine atomization of the droplets and a good control of the paint spray. The finishing quality meets the most severe criteria of flow and of D.O.I. (quality of reflection).
• Regular thicknesses and possibility to apply thick coats in one path.
• ACCUBELL enables to work equally on the exterior or the interior surfaces with the same bell, just by making the size of the paint spray vary.

> Improved transfer efficiency, reduced emissions of volatile organic components (V.O.C.):
• Electrostatic application of water based products. The electrostatic application by direct contact (internal charge) allows reaching very high transfer efficiency: up to 90 %, thanks to the performances of the ACCUBELL, combined with the different types of bells and air shrouds.
• Optimal covering of the parts to be painted.

> Reduced operating costs:
• Less fog by controlling the spray pattern and accuracy of the robotic application = better transfer efficiency.
• Accurate filling of the necessary paint quantity (+/- 1cc).
• Very small product loss upon colour change.
• Reduction of the paint consumption, of the suppression of the booth sludge and water treatment costs.

> Reduced maintenance costs:
• No product hosing or high voltage cable inside the robot arm or inside the application booth.
• Direct filling: no handling of spare reservoir.
• Quick disconnection of the complete atomizer or of the turbine/bell unit.
• No more flow measure with a graduated test tube.

> Accurate control of the paint flow:
• Accurate dosing of the paint when filling and spraying, evenness of the applied coat.
• Quick response time for set values variations.

> Internal concept:
• Even more reduced rinsing/filling times compared to preceding generation, thus a reduction of the colour change time (ex: 10sec for a 250cc rinsing/filling).

> Insulation of the product unit:
• An insulated reservoir is assembled on to the robot; thus it is not crossed by neither paint hosing, nor high voltage cable.
• The service life and the availability of the system are thus greatly increased (wear of the hoses).

ACCUBELL®

• Perfection and flexibility of application

• Reduced emissions of V.O.C.

• Easy water based product application = insulated reservoir

• No product hosing inside the robot arms and 7th-axis cat-tracks

• Quick rinsing and colour-change times = savings

• Accurate paint dosing for application and filling phases

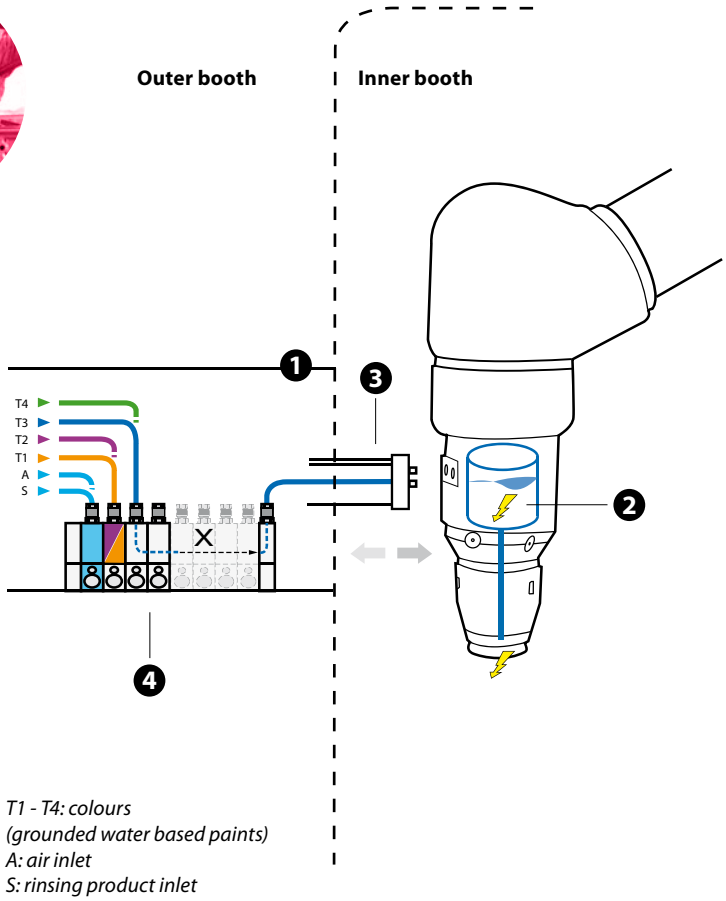
• Excellent repetitiveness of the application adjustments

:: Working description

The ACCUBELL system allows filling 250cm3 of paint inside the atomizer body.
The High Voltage will be applied once the atomizer is disconnected from the "Docking" station **(3)**.

The preparation of the water based paint is thus easier; the high voltage is applied to the entire insulated paint reservoir **(2)** and separately from the paint circuit **(4)**. The paint unit can be placed outside the booth, thus there is **no product hosing inside the robot arm**. Risks of breakdown are then reduced and maintenance made much easier.

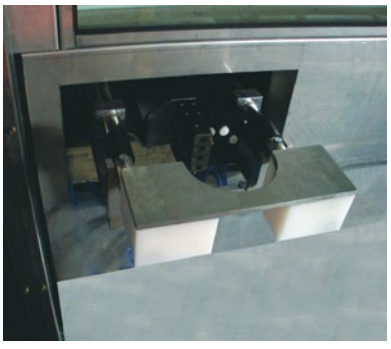
> Simplified description of the process:
The process defines the necessary quantity of paint with respect to the colour and type of part to be coated. The robot positions the ACCUBELL atomizer to connect it onto the docking station **(1)**. The atomizer cleaning cycle starts and the necessary quantity of paint is filled into its reservoir **(2)**. The connection at the level of the atomizer is rinsed. The docking block «Docking» **(3)** is disconnected from the atomizer and the robot is ready to work.



T1 - T4: colours (grounded water based paints)
A: air inlet
S: rinsing product inlet

The next colour set-value is transmitted to the colour change block **(4)** in order to prepare the next docking for the rinsing/filling.

Docking block (3)
The docking block ensures the connection of the atomizer to the rinsing/filling station via the docking nose. The atomizer is thus supplied with paint, solvent or air during the different phases of rinsing/filling.
No product hosing is located within the application area.



:: Design

ATEX marking:

ACCUBELL:

CE 0080 Ex II 2 G
EEx > 350 mJ
ISSeP05ATEX032X

GNM 200[1]:

CE 0080 Ex II (2) GD
[EEx > 350 mJ]
ISSeP05ATEX032X
ISSeP06ATEX032X
ISSeP07ATEX001X

(1): This control module allows piloting the UHT 156. It is a combined device that is part of the configuration of the certified equipment and that contributes to its good working. It has to be installed into a non explosive area.

UHT 156 EEx e:

Ex II 2 G
EEx e II
ISSeP00ATEX002U

UHT 156 EEx m:

Ex II 2 G
EEx m II
ISSeP01ATEX008U

Servomotor:

Ex II 2 G
Ex px II T6

:: Technical characteristics

Weight	ACCUBELL 608 WB/SB, 250 cc
Spare atomizer with bell, air shroud and wrist base plate (without any cable or hosing and with empty reservoir)	4.62 kg
Atomizer and wrist base plate	12.820 kg

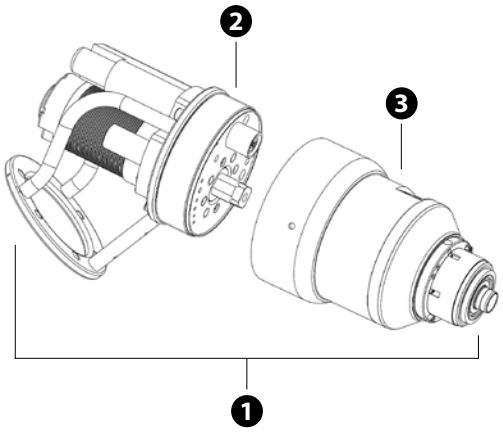
Pneumatic supply	ACCUBELL 608 WB/SB, 250 cc
Nano-valve drive air pressure	8.5 mini (127,5psi) - 10 bar max. (150psi)
Magnetic bearing air pressure	4 mini (60psi) - 7 bar max. (105psi) at 125 Nl/min.
Microphone air pressure	1.9 (28,5psi) to 3 bar (45psi)
Drive air consumption	10 L/min.
Magnetic bearing air consumption	125 L/min.
Shaping air consumption (with respect to air shroud and bell being used)	From 100 to 1000 L/min.
Safeguard air quantity	25 litres at 6 bar (90psi)
Rotation speed	10 000 to 45 000 rpm (upon diameter of bell cup use)

Product supply	ACCUBELL 608 WB/SB, 250 cc
Normal product supply unit	5 (75psi) to 10 bar (150psi)
Paint flow (with respect to type of paint)	50 to 500 cc/min max. The flow can reach up to 1000cc/min on condition that the application quality is satisfying, with respect to the type and product density to be applied.
Viscosity scale (for optimum results)	20 to 45 seconds FORD #4 Cup

High voltage	UHT 156 EEx m	UHT 156 EEx e
Voltage maxi. (kV)	70	70
Current maxi. (µA)	100	100

Performances	ACCUBELL 608 WB/SB, 250 cc
Reservoir capacity	250 cm3
Accurate reservoir filling	+/- 1cc
Accurate flow regulation	+/- 1 % of the requested set-value
Response time for the change of start set-value	100 ms
Color change	**ACCUBELL 608 WB/SB, 250 cc**
Paint consumption	28 cm^3 for 14 colors
Rinsing product consumption	250 cm^3 (not included rinsing box)
Color change time (before filling the paint tank)	10 s.
	+ 1s. for 50 cc filled (under 6 bar dynamic minimum, at 3 l/min with available flow)
Total color changing time	15 s. for 250 cc filled
Same Color (head rinsing + bell cup)	**ACCUBELL 608 WB/SB, 250 cc**
Paint consumption	6 cm^3
Rinsing product consumption	70 cm^3
Color change time (before filling the paint tank)	5 s.
	+ 1s. for 50 cc filled (under 6 bar dynamic minimum, at 3 l/min with available flow)
Total color changing time	10 s. for 250 cc filled

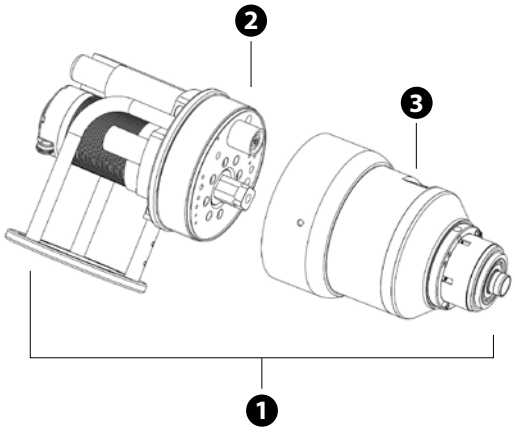
:: Atomizer



ACCUBELL 608 WB/SB, 250cc unit:
Bell and air shrouds unit not included

Wrist	UHT type	Description	Mark	Reference
Structure with wrist at 60°	UHT 156 EEx e	ACCUBELL WB/SB, 250cc	1	910 004 404
		Wrist unit	2	910 004 416
		Atomizer	3	910 002 867
	UHT 156 EEx m	ACCUBELL WB/SB, 250cc	1	910 004 916
		Wrist unit	2	910 004 914
		Atomizer	3	910 003 859

UHT 156 EEx e: High voltage unit with quick disconnect low voltage cable
UHT 156 EEx m: High voltage unit with moulded low voltage cable



ACCUBELL 608 WB/SB, 250cc unit:
Bell and air shrouds unit not included

Wrist	UHT type	Description	Mark	Reference
Structure with wrist at 90°	UHT 156 EEx e	ACCUBELL WB/SB, 250cc	1	910 004 910
		Wrist unit	2	910 003 851
		Atomizer	3	910 002 867
	UHT 156 EEx m	ACCUBELL WB/SB, 250cc	1	910 002 868
		Wrist unit	2	910 002 170
		Atomizer	3	910 002 867

UHT 156 EEx e: High voltage unit with quick disconnect low voltage cable
UHT 156 EEx m: High voltage unit with moulded low voltage cable

TRP 501 / TRP 502

The TRP gun is used for the application of **water or solvent based paints**. The additional advantage of the TRP is to enable the application at **very high flow** (up to 1200 cm3/min with certain configurations) while combining the **pneumatic** and electrostatic **effects**.

The TRP gun is light, compact and has much **flexibility of use**. Its simple and robust design makes it **extremely reliable**.

For more than 20 years, The TRP gun has been the reference in the world of automotive finishing, often copied by never equalled.

:: Examples of application

> Car body interiors

> Door cut-ins

> Rocker panels

> Penetration in hollow body (dead areas…)

> Any type of openings (ventilation louvers on bumpers...)

> Metallic base coat: 2nd base coat with Bell/Gun process

> Bumper

:: Customers' benefits

> Simple and reliable design = numerous references:
The transfer efficiency is high; it is doubled compared to a conventional gun application (30% to 60% depending on the shape of the part, the paint being used and the working adjustments). The electrostatic application enables to save considerably the necessary quantity of paint with respect to a given production rate.

From the first paint coat, the electrostatics attracts the paint at the back of the part, and only a light application is needed to entirely cover the whole part.

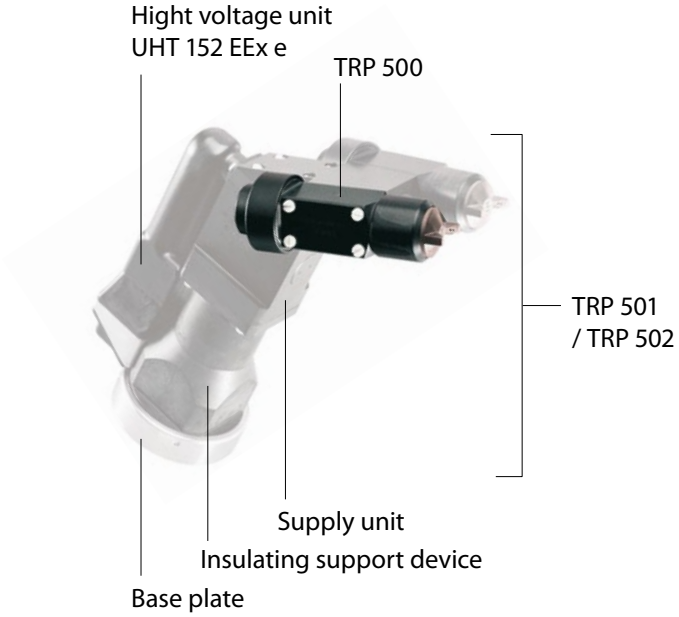
> Simplified maintenance:
The high transfer efficiency reduces the VO.C. emissions (volatile organic components); this makes its compliance with the environment legislation easier and allows reducing the dirt within the booth due to the application. Also, a dump valve is integrated inside the sprayer that enables the priming, rinsing and dumping of the equipment, with a minimum of product spraying within the booth; maintenance is thus reduced.

> Easy-to-use:
The adjustments of all the gun parameters (product flow, paint spray, product opening control) are remotely controlled, manually or by a PLC.

:: Description of the gun

• The TRP 500 spraying head is the basic unit of the TRP 501 and 502 guns.
These spraying heads can produce a flat- or round-shape spray pattern. A control air triggers spraying on and off, thus freeing spraying airs and authorizing paint passage.

• This set is composed of a supply unit on which is assembled a support device allowing orientating the TRP 500 with respect to the robot arm (60° or 90°). An insulating support device thus maintain this whole set to the quick disconnect base plate. The supply unit is equipped with one or two product inlets, a product dump/rinsing outlet, a high voltage inlet and air inlets (needle drive, dump, spraying airs).



:: Range

> The **TRP 501** sprayer is equipped with a gun on which can be assembled either a flat or round (Vortex effect) spray nozzle:

• The flat spray is equipped with a metal injector to guaranty a steadfast spraying quality in the long run (few wear). The injector diameter is of 1.5 mm and comes in several versions.

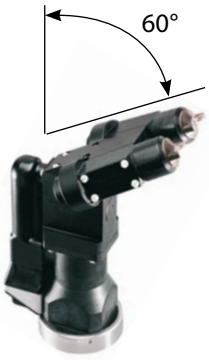
• The round spray comes in four calibres:
- calibre ø8 mm = standard
- calibre ø6, 12 and 20 mm = as an option

> The **TRP 502** sprayer is equipped with two flat spray guns. The converging patterns are directed at the part as one pattern, and are supplied and piloted simultaneously. TRP 502 versions provide twice the paint flow offered by TRP 501 versions.

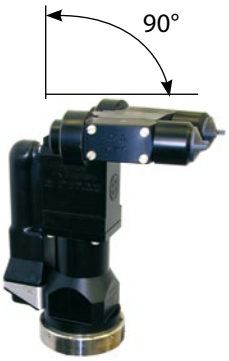
• The gun is assembled onto a support allowing two tilting angles.

> The paint supply of both **TRP 501 & 502** sprayers comes in several versions:

• With or without modular-built product regulator,
• With simple dump (SP) of the paint circuit (one paint circuit inlet),
• or with double dump (DP) of the paint circuit (two paint circuit inlets).
With TRP 502 version, the air and product supplies are shared by both spraying heads.



TRP 502



TRP 502

Rinsing box TRP 501

• Essential to the interiors

• The rinsing box is used to clean and dry the exterior of the sprayer that is exposed to dirt and to recycle the rinsing product.

• The rinsing box is available as an option (Please, consult Sames for more information).

:: Technical characteristics

Supplies	TRP 501 / 502
Maxi. air pressure	6 bar (90 psi)
Maxi. Product pressure	6 bar (90 psi)
Drive standard pressure	5 bar (75 psi)
Product opening response time	25 msec (for information only)
Product cut response time	30 msec (for information only)

High voltage	UHT 152 EEx e
Voltage maxi.	100 kV
Current maxi.	200 µA

Spraying	Round spray	Flat spray (TRP 501)	Flat spray (TRP 502)
Spray pattern width (mm) for information only	100 to 400	100 to 500	660
Airs total flow (Nm^3/h)	7 - 27	7 - 40	14 - 80
Paint flow (cc/min)	from 100 to 500	from 100 to 800	from 200 to 1200
Viscosity per second (FORD #4 cup)	from 14 to 68		
Maxi. resistivity (MΩ.cm)	500		

ATEX marking:

TRP 501/TRP502:

CE 0080 Ex II 2 G

EEx > 350 mJ
ISSeP05ATEX032X

GNM 200[(1)]:

CE 0080 Ex II (2) GD

[EEx > 350 mJ]
ISSeP05ATEX032X
ISSeP06ATEX032X
ISSeP07ATEX001X

UHT 152 EEx e:

Ex II 2 G

EEx e II
ISSeP00ATEX004U

(1): This control module allows piloting the UHT 152. It is a device that is part of the configuration of the certified equipment and that contributes to its good working. It is installed into a non explosive area.

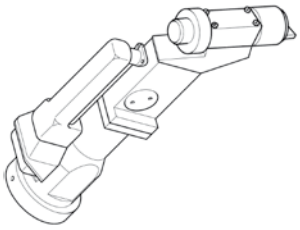
> For the application of solvent based paints of which resistivity is > to 0.5 MΩ.cm, all the conductive parts have to be grounded (product tank, pressurised tank, moduclean, metal fittings, etc...). In order to minimize the leakage current into the paint circuit, it is recommended to use small diameter hosing (ex: ø4x8 mm) and of 5-meter length maximum between the sprayer and the metal fitting or grounded bulk-head union.

> For the application of water based paints that are non-flammable or hard to set fire to, (resistivity of a few kΩ.cm), the paint supply has to be electrically insulated (product tank, pressurised tank, moduclean, metal fittings, etc...). Do provide for all the necessary safeties to avoid any electrical shocks to the operator.
Please, consult Sames for more information.

:: Sprayer

TRP 501 unit **single product circuit**

Description	Regulator	Angle adapter	Reference
TRP 501 SP AR QD	Yes	60°	1 521 595
		90°	1 518 921
TRP 501 SP SR QD	No	60°	1 524 316
		90°	910 002 320
TRP 501 SR Without dump valve	No	90°	1 518 920

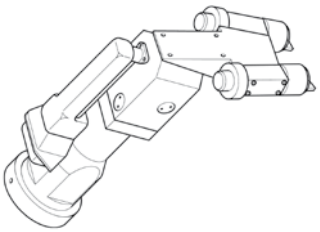


TRP 501 unit **double product circuit**

Description	Regulator	Angle adapter	Reference
TRP 501 DP AR QD	Yes	60°	1 522 920

TRP 502 unit **single product circuit**

Description	Regulator	Angle adapter	Reference
TRP 502 SP AR QD	Yes	60°	910 002 319
		90°	910 002 317
TRP 502 SP SR QD	No	60°	1 516 754
		90°	910 002 318



SP: single dump circuit, DP: double dump circuit, AR: with regulator, SR: without regulator, QD: quick-disconnect base-plate

:: Spraying head

TRP 500 alone

Description	Restrictor (ø mm)	Injector (ø mm)	Reference
TRP 500 JP	1.4	1.5	752 949
TRP 500 JPL	1.4	1.5	752 950
TRP 500 JR	1.2	8	752 991

JP: standard flat spray, JPL: flat spray with larger spray pattern

:: Accessories: Measure «Test aircaps»

Description	Material	Reference
JP Cap (same as JP cap 436 939)	Brass	437 257[1]
JP Cap (same as JP cap 422 513)	Brass	423 753[2]

(1): standard pattern, (2): wide pattern

The air caps permit to measure the pressure (bar) of the air plenum (fan air and centre air) at the level of the gun head.
This measure is very important to define the shape of the pattern (spray symmetry, width…).

:: Nuts, caps and nozzles

Flat spray nozzle – single or dual circuit

Description	Injector (ø mm)	Reference
Single circuit JP nozzle – **SS injector**	1.1	730 355
	1.2	755 287
	1.5	439 058
Single circuit JP nozzle – **All SS**	1.2	428 375[3]
	1.5	429 064 [3]
Dual circuit JP nozzle	1.1	752 056
	1.5	752 055

(3): The flat spray nozzle is all stainless steel material – cast in one piece.

Round spray (Vortex) nozzle – without injector

Description	Reference
JR Nozzle	752 983

The nozzle base is common to all round spray (Vortex) injectors.

Round spray injector

Description	Injector (ø mm)	Reference
JR injector	6	455 234
	8	455 235
	12	455 236
	20	455 237

The injector equipped with its electrode is screwed onto the round spray nozzle.

Round and flat spray caps

Description	Matière	ø (mm)	Reference
JP Cap - standard pattern	Plastic		436 939
JP Cap - wide pattern	Plastic		422 513
JP Cap - standard pattern	Brass		733 957
JP Cap - wide pattern	Brass		Consult Sames
JP Cap - **for all SS nozzle**	Brass	nozzle 1.2	428 376
	Brass	nozzle 1.5	429 063
JR cap	Plastic	6	430 804
		8	430 540
		12	430 179
		20	430 719

Round and flat spray nuts

Description	Reference
JP nut	745 066
JR nut	749 982

Notes

Peripherals

Peripherals

Peripherals

Peripherals

Pe

« Bells and air shrouds » range

HI-TE range

Moduclean - Moduflow

Insulated paint regulator

Pumps

Reverse-flush

Microphone – Optical fibre

AP 1000- HVP 125

Feather dusting machines

Line-integrated rinsing system

Range of bells and air shrouds

The bells are the key elements of the paint application. They are of major importance for the finishing results.
Sames bells are the guarantee of excellent application results.
Their particular design permits applying all the types of paints, either water based or solvent based, while drastically reducing the paint consumption.

Magnetic bell cup is fitted on the turbine manually

:: Fields of application

Four different diameters are available: ø 35, 50, 65 and 80 mm enabling to reach the target application result. Sprayer bells are easily swaped thanks to a simple tool.

«EC» range distinguishes itself by a tulip-shape bell; it tools up all the atomizers of the range 7 (HVT turbine) and Accubell (HVT or PAM turbine).
Each bell is thus combined to an air shroud with Vortex or straight effect, or even with the new HI-TE technology.
Only one bell differs with an inner widened form; it is exclusively associated to the combined air shroud (HI-TE technology). It has a 65-mm diameter and is called «EX65 HI-TE».

EC35 perfectly meets the application requirements of car body interiors (cut-ins…).
In Tier 1, the small diameter, specific to bumpers and small parts, enables a thorough penetration of recesses as the spray pattern is narrowed; for primer, base or clear application.

EC50 is ideal for the car body interiors as well as for the exteriors in primer, base in 1st coat and clear. In Tier 1, it meets the requirements in primer, base and clear.

EC65 is at ease for car body exterior application but also for a multi-purpose use.

EX65 and EC80 are exclusively dedicated to exterior car bodies, in particular to base coats and more precisely to an improved colour-match with Bell/Bell process.

:: Customers' benefits

> Finishing quality:

The technology used (rotary bell) combines the finest atomization of the paint to the easiest control of the spray pattern. The finishing quality meets the most severe criteria of flow and D.O.I. (quality of reflection).

> The rotary bell combined to the high voltage guaranties:

- a high level of productivity
- homogenous spraying
- regular paint spray
- optimal covering of the parts to be painted (the skirting-round effect allows a paint deposit behind the part)

> Paint saving:

The transfer efficiency is high and can be superior to 80% depending on the shape of the part, the paint being used, the bell type and the working adjustments.

> Simplified maintenance:

The smooth surface of the bell is easily cleaned; an automatic cleaning system for several bells at a time is also available to maintain a perfect application result.

:: Bell/Bell process

> The paint application process for the Automotive and Tier 1 markets is composed of:

• A first base coat: applied with a bell for 50 to 70 % of the total base coat.

• A second base coat (called "dust coat"): applied with standard gun or with electrostatic gun = 50 to 30 % of the remaining base coat.

The second base coat applied with a gun allows obtaining the target colour-match.

It is used for orientating the particles that give the metallic aspect.

> SAMES allows applying metallic bases in first coat AND in dust cost with Bell/Bell process. This latter allowing obtaining the colour-match of the applied colours together with much higher transfer efficiency: Indeed, the bell application is close to a transfer efficiency rate of 65% against 30% with gun application.

EC 50 TPAM

Performances

• Robot motion speeds can be high and reach up to 1200 mm/sec.

• Possibility of varying the spray pattern diameters (from 100mm to 600 mm), sprays are sturdy and the transitions very swift.

• Improved transfer efficiency with HI-TE

• Less shaping air used (50%)

• All paints: Solvent, water based, 1K, 2K.

• All applications: Primer, Base, Clear

• Metallic base dust coat

• Easy process for the "Colour Match"

• No running or pit with water borne base or clear

• Easy-to-use (maintenance and assembly)

• Quick assembly and disassembly of all Sames bells and air shrouds.

HI-TE range

«HI-TE» technology is the new reference on the automotive paint market. It allows obtaining **variable patterns** during spraying proess, while guarantying the **sturdiness** of the pattern range with **swift transitions**.

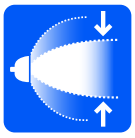
It presents numerous advantages that allow:

- **working more quickly up to more than 1 meter per second.**

- **with higher flows, superior to 800 cc/min.**

- **with the highest transfer efficiencies, reduction by more than 30% of product losses,**

- **with guarantied pattern sturdiness, uniform and stable pattern for the whole variation range of paint spraying,**



- **with the insurance of the best finishing quality, colour-match index IV, the highest.**

:: Field of application

EC 35 Hi-TE

> High transfer efficiency
> Use of high flows
> Interiors of vehicles
(Primers, Basecoats, Clearcoat)
> Trajectories with variable pattern width
> Optimized for coating narrow surfaces and difficult recesses
> Paint flow from 100 to 600 cm³

EC 50 Hi-TE U
EC 50 Hi-TE W

> High transfer efficiency
> Use of high flows
> High tip speed of robot
> Trajectories with variable pattern width
> Bumpers (Primers, Basecoats, Clearcoat)
> Interiors of vehicles
> Exteriors of bodies (Primers and Clearcoats)
> Optimized for high paint flow at high tip speed
> Paint flow from 250 to 850 cm³

EX 65 Hi-TE

Widened bell with combined airs shroud

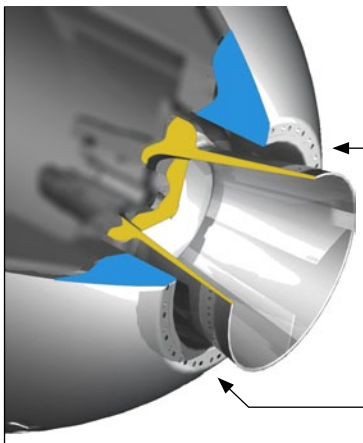
> Dusting on basecoat (2nd layer)
> High transfer efficiency in a BELL/BELL process
> Exteriors of bodies
(Solvent bases and waterborne)
> Very high performance on colormatch
> Very useful for metal base application
> Exteriors of bodies (Solvent bases and waterborne)
> Optimized for the BELL/BELL process
> Paint flow from 100 to 350 cm³

:: Characteristics

EC35 HI-TE
High transfer efficiency
(TE% > 85%)
Variable pattern on a wide range
(from 75 mm to 350 mm)
W50 minimum < 100 mm.
(W50 = 75 mm water borne base)
Easy to implement
(fixed ratio and linear characteristics

EC50 HI-TE-U
High transfer efficiency
(TE% > 90%)
Variable pattern on a wide range
(from 135 mm to 450 mm)
Easy to implement
(fixed ratio and linear characteristics

EC50 HI-TE-W
The W (wide) version is recommended for the wide pattern applications (320 to 450 mm width), with low to medium paint flow (200 to 500 cm^3)
Easy to implement
(fixed ratio and linear characteristics

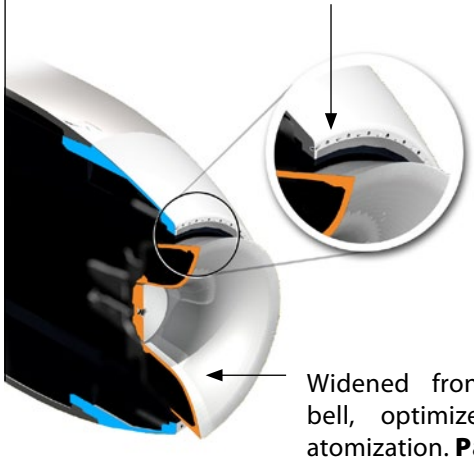


A shroud composed of pairs of combined airs on a similar diameter. **Patented**

Narrow front face, reducing pollution while spraying.

A shroud composed of pairs of combined airs on a similar diameter. **Patented**

EX65 HI-TE



Widened front profile of the bell, optimized for a better atomization. **Patented**

Application

Narrow pattern on the edges and the small surfaces = Less paint outside the target

Very swift

transition

Wide pattern on wide surfaces = Reduction of spraying times

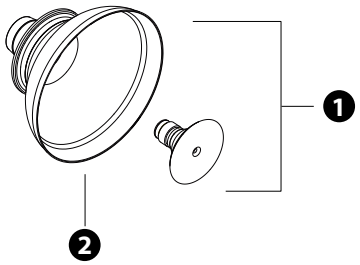
:: Bells

Bells for **HVT** turbine

The bells are magnetically held, they are directly assembled on to the turbine rotor

Description 1	Diameter	Bell material 2	Reference
EC bell	35 mm	Aluminium	910 000 636
	50 mm	Aluminium	910 003 159
	65 mm	Aluminium	910 000 635
		Titane	910 000 672
	80 mm	Aluminium	910 000 600

HVT: High velocity turbine (85k rpm max.)



EX65 bell	65	Aluminium	910 004 615
EX65-EXT bell	65	Aluminium	910 006 080

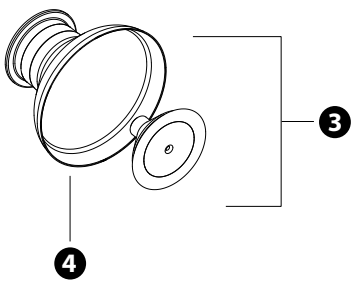
EX65-EXT bell: bell that is exclusively used to the atomizer equipped with external charge

Bells for **TPAM** turbine

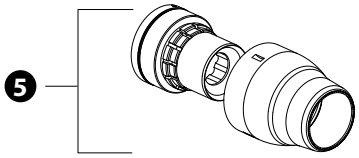
The bells are magnetically held, they are directly assembled on to the turbine rotor

Description 3	Diameter	Bell material 4	Reference
EC35 bell & **EC50** bell	35 mm	Aluminium	910 000 877
	50 mm	Aluminium	910 000 876
EX65 bell	65 mm	Aluminium	910 008 179

TPAM: S12 type turbine with magnetic air bearing



:: Air shrouds



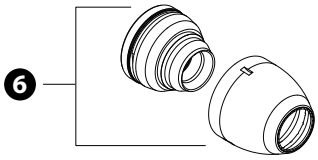
Air shrouds for **HVT** bells

Description 5	Bell diamater	Effect type	Reference
Air shrouds set for **EC** bells	35 mm	Tilted holes, Vortex effect	910 003 193
	50 mm	Tilted holes, Vortex effect	910 003 192
	65 mm	Tilted holes, Vortex effect	910 000 674
		Straight air passage	910 000 856
	80	Tilted holes, Vortex effect	910 000 673

HVT: high velocity turbine
The straight outer shroud has straight drillings for the passage of the air. This shroud is recommended for a better penetration of the paint spray.
Straight air passage: allows very wide patterns.

Hi-TE air shrouds for **HVT** bells

Description 5	Bell diamater	Robotic atomizer	Reference
Hi-TE air shrouds set for **EC35** bells	35 mm	PPH 707	910 008 354
		ACCUBELL 708	910 006 770
Hi-TE-U air shrouds set for **EC50** bells	50 mm	PPH 707	910 006 932
		ACCUBELL 708	910 006 772
Hi-TE-W air shrouds set for **EC50** bells	50 mm	PPH 707	910 008 532
		ACCUBELL 708	910 008 534
Hi-TE air shrouds set for **EX65** bells	65 mm	PPH 707	910 008 535
		ACCUBELL 708	910 008 536
Hi-TE air shrouds set for **EX65-EXT** bells	65 mm	PPH 707-EXT, ACCULOOK 707-EXT	910 006 820



Air shrouds for TPAM bells & **Hi-TE** air shrouds for **TPAM** bells

Description 6	Bell diamater	Effect type	Reference
Air shrouds set for **EC** bells	35 mm	Tilted holes, Vortex effect	910 001 297
	50 mm	Tilted holes, Vortex effect	910 001 298
Hi-TE air shrouds set for **EC50** bells	50 mm	Pairs of combined air holes	910 007 433
Hi-TE air shrouds set for **EX65** bells	65 mm	Pairs of combined air holes	910 008 211

> Air shroud combined to each bell: The upper part of the shroud (nozzle) is made of stainless steel and has the drillings necessary to the passage of the air. Cleaning is thus easier and prevents the risk of damaging the holes; spray quality is thus maintained.

Anti-dirt air shrouds

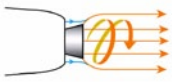
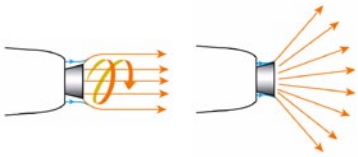
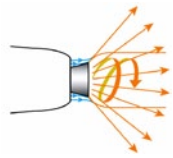
- Reduced cleaning costs
- Profit from the advantages engendered by the anti-dirt shrouds. These air shrouds allow considerably increasing the time between two cleaning phases.

:: Choice of the bell with respect to the surface to be painted

Hi-TE

		Internal charge	*External charge*
Exteriors (Large surfaces, hoods, roofs, wings, doors ...)	Primer	**EC50 Hi-TE-U**	**EX65 Hi-TE EXT**
	Basecoat 1	**EC50 Hi-TE-U**	**EX65 Hi-TE EXT**
	Basecoat 2	**EX65 Hi-TE-U**	**EX65 Hi-TE EXT**
	Clearcoat	**EC50 Hi-TE-W**	-
Interiors (Cut-ins, rocker panels, motors ...)	Primer	**EC50 Hi-TE-U / EC35 Hi-TE**	-
	Basecoat 1	**EC50 Hi-TE-U / EC35 Hi-TE**	-
	Basecoat 2	**EX65 Hi-TE**	-
	Clearcoat	**EC50 Hi-TE-U / EC35 Hi-TE**	-
Bumpers	Primer	**EC50 Hi-TE-U**	-
	Basecoat 1	**EC50 Hi-TE-U**	-
	Basecoat 2	**EX65 Hi-TE-U**	-
	Clearcoat	**EC50 Hi-TE-U**	-

:: Choice of bell combined to an air shroud with respect to different processes

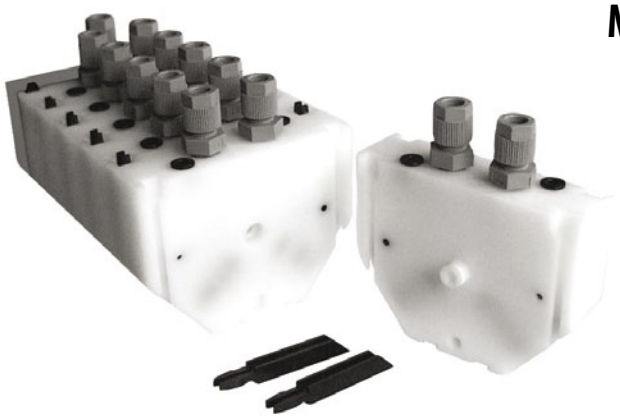
		Solvent based primer	Base 1	Base 2 (dust coat with bell)	Clear (1K, 2K)
Vortex air shroud 	EC35 TPAM	●	●		●
	EC50 TPAM	●	●	●	●
Straight air shroud 	EC65	●			●
HI-TE, combined air shrouds 	EC35 HI-TE	●	●		●
	EC50 HI-TE-U EC50 HI-TE-W	●	●		●
	EX65 HI-TE EX65 Hi-TE EXT			●	

● = recommended use ● = possible use

W50

Useful spray pattern width during application. This width is measured on a complete pattern shape at maximum half-thickness.

MODUCLEAN - MODUFLOW



MODUCLEAN and MODUFLOW are **colour-changer blocks**, their **compact** and **modular** design allows adding several components (slices).
Each slice allows using two products (paint or rinsing product) thanks to micro-valves.
The colour-changer block is used similarly with all the automatic spraying equipment: PPH 707, TRP 500, ACCUBELL, etc...

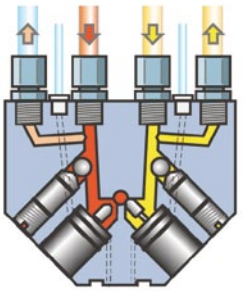
:: Range

There are two models of slices:

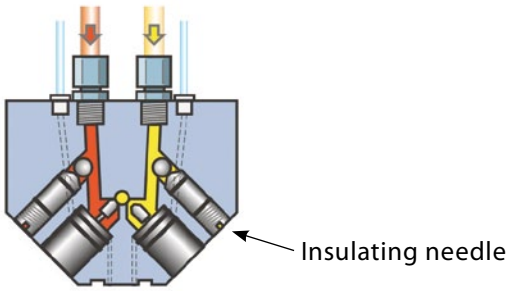
the choice depends on the type of product: a constant circulation of the product avoids stagnation within the hosing; it is thus recommended using a slice equipped with product return.
The micro-valve that comprises the slice allows using any type of products, either solvent or water based.

Moduclean model

The Moduclean slice includes an insulating needle that allows cutting the product input upstream of the micro-valve. This latter can be then replaced without cleaning the paint circuit and without stopping the possible product circulation (in its version «with return circuit»).



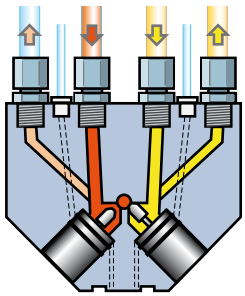
Slice with product return



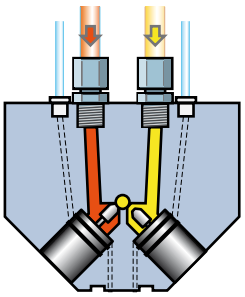
Slice without product return

Moduflow model

The Moduflow slice does not include any insulating needle.



Slice with product return



Slice without product return

:: Customers' benefits

> Modular:
The slices are easily added up or removed thanks to snap-on bar (no tool required). Each slice ensures a perfect tightness of the product passage.

> Product saving:
The reduced dimensions of the MODUCLEAN or MODUFLOW blocks allow their fitting close to the sprayer, thus shortening the product hosing length: optimized colour-change time, minimized rinsing product consumption and paint losses.

> Simplified maintenance:
The micro-valve can quickly be changed without removing the MODUCLEAN block and without stopping the product circulation: no production stop.

Example of use for 4 colours (**diagram 1**), the block includes:

:: 2 slices (colour from 1 to 4)
:: 1 slice for rinsing (A = air / S = Solvent or Water)
:: 1 inlet slice
:: 1 outlet slice
The Moduclean block becomes modular in case of the addition of other colours.

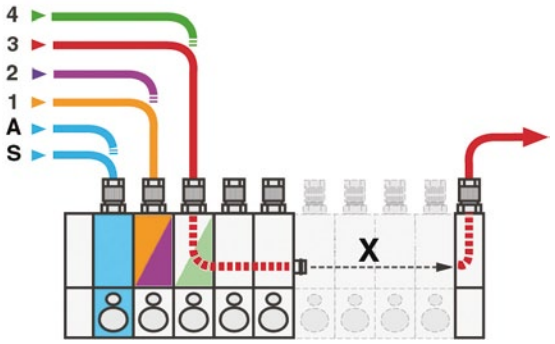


diagram 1

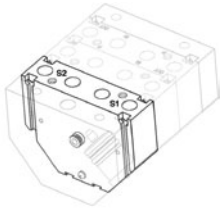
:: Technical characteristics

Dimension	Slice	End parts (inlet/outlet)
Longueur (mm)	28	20
Largeur (mm)	104	104
Hauteur (mm)	80	80
Poids avec raccords (g)	250	

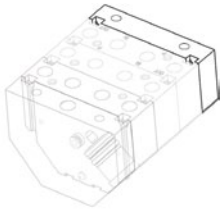
Supplies	Slice / End parts (inlet/outlet)
Maxi. product pressure (bar)	10 (150 psi)
Maxi. back pressure (bar)	40 (600 psi)
Maxi. pilot pressure (bar)	8 (120 psi)
Pilot air	filtered, dehydrated, de-oiled
Response time (product trigger)	50 ms with 0.5m pilot hose ø 2.7x4 mm
Response time (product trigger)	300 ms with 15m pilot hose ø 2.7x4 mm
Viscosity, Ford cup #4 (seconds)	40

:: Colour-changer block

Description	Version	Type	Reference
MODUCLEAN slice	Europe	with return	1 514 627
		without return	1 514 628
MODUFLOW slice	Europe	with return	1 523 539
		without return	1 523 538
	US	with return	1 513 310
		without return	1 512 712

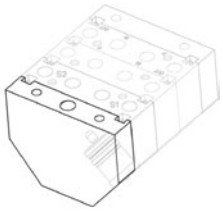


Description	Version	Reference
Inlet slice	Moduclean - Moduflow EU/US	1 519 870



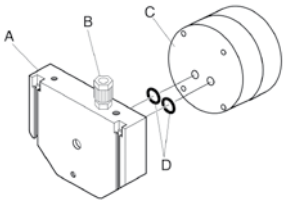
Description	Version	Reference
Outlet slice - 1 outlet	Moduclean EU - Moduflow US	1 519 871
	Moduflow EU	1 523 588

The MODUCLEAN block unit is fixed at both ends by 4 screws

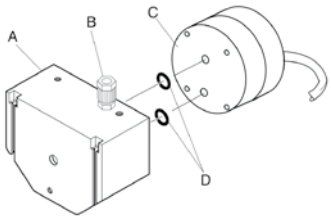


:: Optional base plate for flowmeter and ball regulator connection

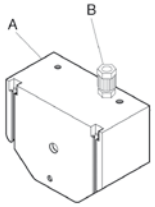
Description	Type	Version	Reference
Outlet base plate for flowmeter	Horizontal flowmeter connection	Moduclean	856 040
		Moduflow EU	1 523 559
		Moduflow US	856 035

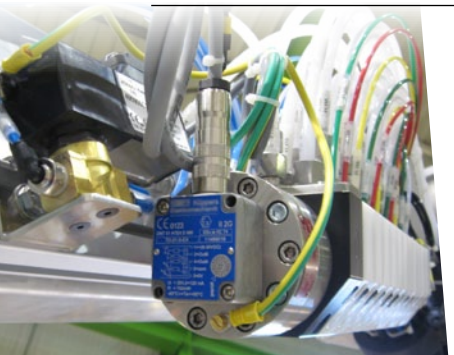


Description	Type	Version	Reference
Outlet base plate **for flowmeter with integrated ball regulator**	Vertical flowmeter connection	Moduclean	910 000 309



Description	Type	Version	Reference
Outlet base plate		Moduclean	910 001 891
With integrated ball regulator	Reversed regulator position	Moduclean	910 001 604





Caption

A	Adapter base plate, it is assembled instead of an outlet slice (1 519 871)
B	Product outlet, the product fitting is not included in the outlet base plate
C	Flowmeter, not included in base plate reference
D	O'rings included in the outlet base plate reference

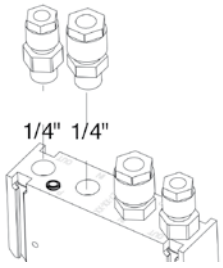
:: Fittings

The product fittings are not provided with the MODUCLEAN / MODUFLOW slices as they can change from one system to another to match used fluid flow.
In the case of a slice with product return, the fittings are of same diameter.

MODUCLEAN

Description	Adapter on	Hose ø (mm)	Reference
1/4 G Fitting	Slice	6 x 8	F6R PUK 320
		8 x 10	F6R PUK 322
	Outlet slice	6 x 8	F6R PUK 320

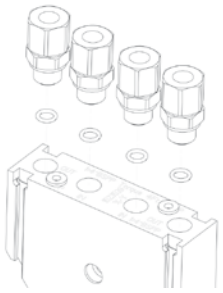
Fittings are sold by the piece.
4 fittings for one return slice.
2 fittings for one no-return slice.



MODUFLOW - EU

Description	Adapter on	Hose ø (mm)	Reference
1/4 G Fitting	Slice or	6 stainless steel	1 410 743
	Outlet slice	8 stainless steel	1 410 736
		10 stainless steel	1 410 737
		12 stainless steel	1 410 742
PTFE (Teflon) O'ring			J3T TCN 006(1)

Fittings are sold by the piece.
(1) Reference including 2 O'rings, change the O'ring at each disassembly of the fitting
4 fittings for one return slice.
2 fittings for one no-return slice.

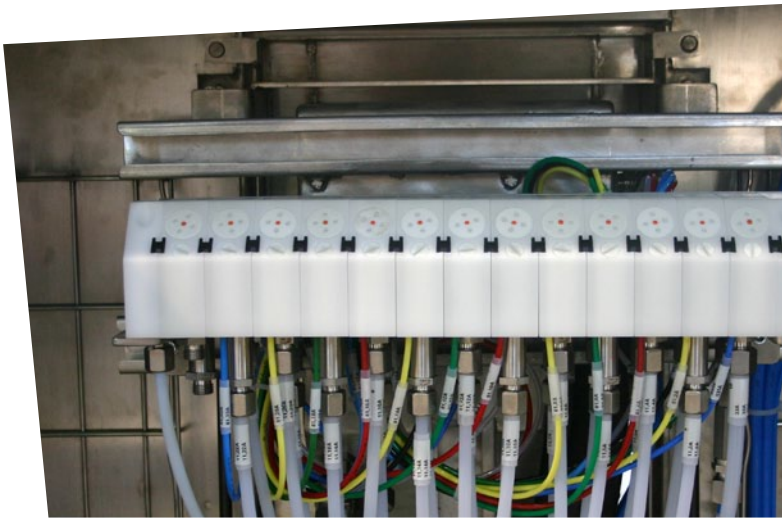


Please, consult Sames for the references and the assembly instructions with metallic fittings.

MODUFLOW - US

Description	Adapter on	Hose ø (mm)	Reference
1/4 NPT Fitting	Slice or	6 x 8	1 411 928
	Outlet slice	-	F6R PUQ 217

Fittings are sold by the piece.
4 fittings for one return slice.
2 fittings for one no-return slice.



ATEX marking:

Flowmeter:

CE Ex II (1)/2 G
EEx SYST (ia IIB T4)
INERIS05ATEX007X

:: Rinsing block

Description	Type	Reference
Equipped rinsing block	without return EUROPE	857 723

This reference includes: 1 514 628 + 1 519 870 + 1 519 871, refer to § Colour-changer block

:: MODUCLEAN Colour-changer block

The MODUCLEAN slices are of **without-product-return type**

Description	number of colours	Reference
Block without return	2	910001348
	4	910001349
	6	910001350
	8	910001351
	10	910001352
	12	910001353
	14	910001354
	16	910001355
	18	910001356
	20	910001357
	22	910001358
	24	910001359
	26	910001360
	28	910001361
	30	910001362
	32	910001363
	34	910001364
	36	910001365

The product fittings are not included in the colour-changer blocks.

The MODUCLEAN slices are of **product-return type**

Description	number of colours	Reference
Block with return	2	910001366
	4	910001367
	6	910001368
	8	910001369
	10	910001370
	12	910001371
	14	910001372
	16	910001373
	18	910001374
	20	910001375
	22	910001376
	24	910001377
	26	910001378
	28	910001379
	30	910001380
	32	910001381
	34	910001382
	36	910001383

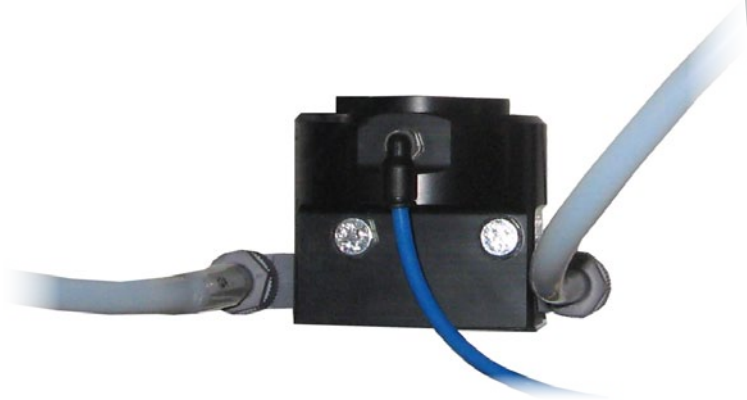
The product fittings are not included in the colour-changer blocks.

Product regulator

The ball paint regulator comes in two versions:

> Ball regulator directly integrated within a special MODUCLEAN base plate (refer to § Optional base plates).

> Stand-alone ball regulator that is independently installed onto the paint circuit as closely as possible to the sprayer (recommended).



:: Description

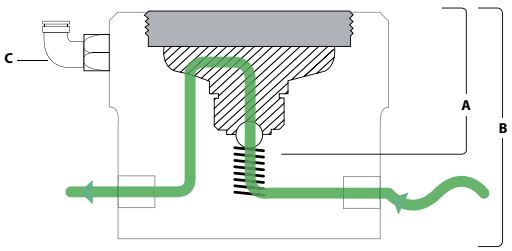
The regulator allows **absorbing** the **variations** of paint pressure generated by the supply system (pulsation effect) and **adjusting** the target **flow** with accuracy.

For a given pilot air pressure of the regulator, the paint flow will also depend on the pressure drop downstream of the regulator (on sprayer side): hose diameter, size of the restrictor, sprayer injector and product viscosity.

:: Insulated regulator

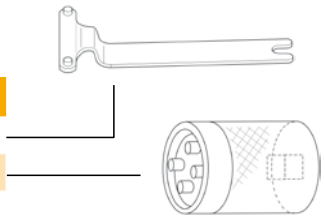
Description	Mark	Version	Reference
Integrated ball regulator	A	Europe	1 514 104
		US	1 514 104
Complete insulated ball regulator(1)	B	Europe	1 526 677
		US	1 518 698
Elbow union(2) (pilot air)	C	Europe	F6R LCS 304
		US	F6R PDQ 206

(1): Paint circuit connection type EU = 1/8 GAZ and US = 1/8 NPSM
(2): Only for insulated regulator (included with insulated regulator reference)



:: Tools

Description	Reference
Regulator nut disassembly key	546 351
Nut tightening automatic tool	1 403 479



Gear pump

The gear pump is used for the supply of liquid **paints**, either **solvent** or **water based**, for all Sames automatic sprayers.

Pompe compact

:: Description

The gear pump ensures a paint **flow** that is proportional to its rotation speed.
Its use ensures a **regular** and **accurate** flow. The pump has to be supplied with a product at 0.5 bar pressure. In the case of a distribution system, the product pressure regulator is to be connected before the pump, whereas a flow meter is always connected after the pump. Upstream pressure facilitates priming but also ensures the flow corresponding to the capacity and speed of the pump.

:: Range

This type of pump comes in 6 capacities defined by the number of cm3 per revolution:
- 0.6 cm3 / rev
- 1.2 cm3 / rev
- 2.4 cm3 / rev
- 3 cm3 / rev
- 6 cm3 / rev
- 10 cm3 / rev

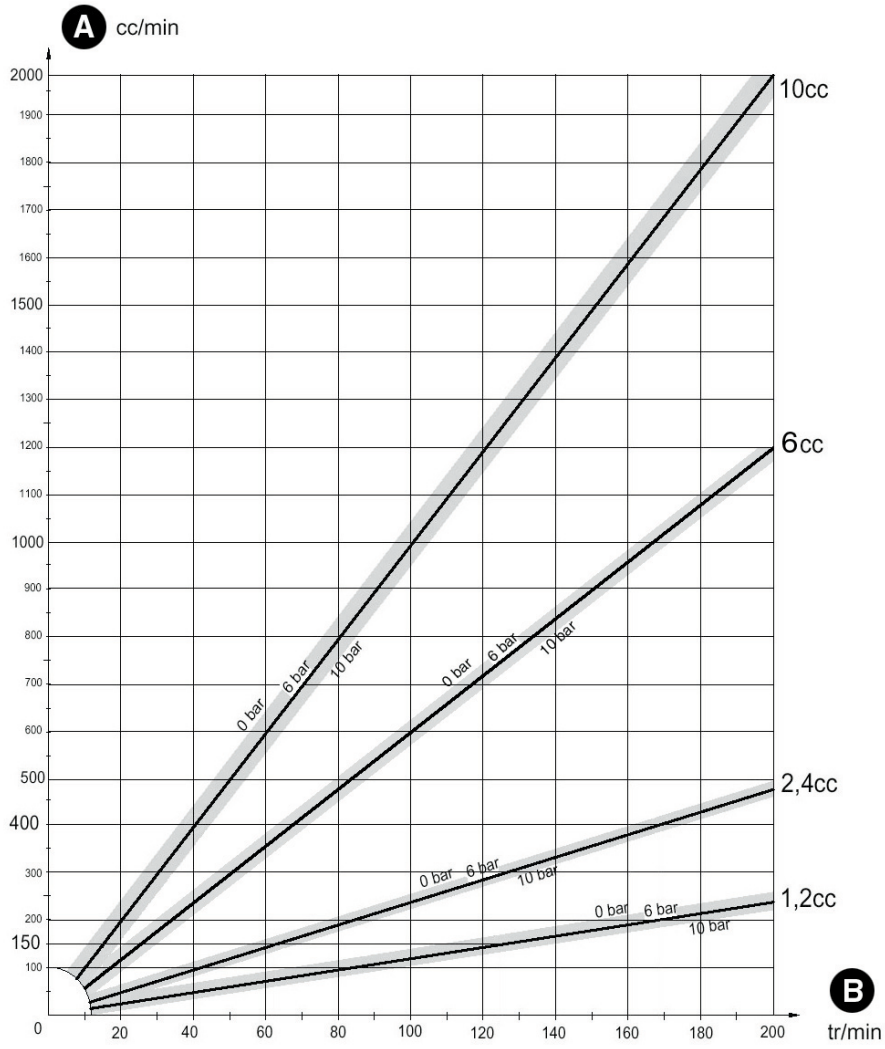
These different capacities allow covering a flow bracket from 0.5 to 80 L/hour.
The choice is made with respect to the target flow and the rotation speed bracket. It is recommended to run at less than 120 rpm.

Pumps come in two versions with respect to their coatings:

- **Stainless steel**: for the handling of solvent or water based products.
- **ADLC coated**: coating with very hard surface and with a better friction coefficient. This type of pump can be cleaned by injecting rinsing product at a strong flow; thus the pump is rapidly cleaned.

The use of water based products imposes using volumetric pumps adapted to these products.

:: Type of pump selection



A: Product flow in cc/min
B: Pump rotation speed in rpm

The curve indicates the flow of the pump with a back-pressure from 0 to 6 and from 6 to 10 bar.
One must not select a pump of which flow would be too close to the minimum or maximum speed, but close to 100 rpm.

:: Technical characteristics

Pressure	Valve drive	Supply	Use
Maxi. operating air pressure . (bar)	6 (90 psi)		
Mini. operating air pressure (bar)	3 (45 psi)		
Pilot air supply (mm)	ø2.7x4		
Mini. inlet product pressure (bar)		0.5 (7.5 psi) to facilitate priming	
Maxi. inlet product pressure (bar)		2 (30 psi)	
Maxi. outlet product pressure (bar)			10 (150 psi)
Maxi. rotation speed (rpm)			220

Connections	Inlet	Outlet
Pump connection bar (BSP)	1/4	1/4

:: H-shaped gear pump

Description	Mark	Capacity (cm³/rev)	Reference
H-shaped pump	A	1.2	758 704
Stainless steel		2.4	756 515
		6	-
		10	756 560
H-shaped pump	A	1.2	1 410 767
ADLC(1)		2.4	1 410 670
		6	1 410 031
		10	1 410 030

(1): coated with very hard surface (very long service life)

:: Compact gear pump

Description	Capacity (cm³/rev)	Reference
Compact pump	1.2	1 412 228
	2.4	1 313 378
	6	1 412 243
	10	1 412 152
Compact pump	1.2	-
ADLC(1)	2.4	910 000 903
	6	1 411 476
	10	910 001 606

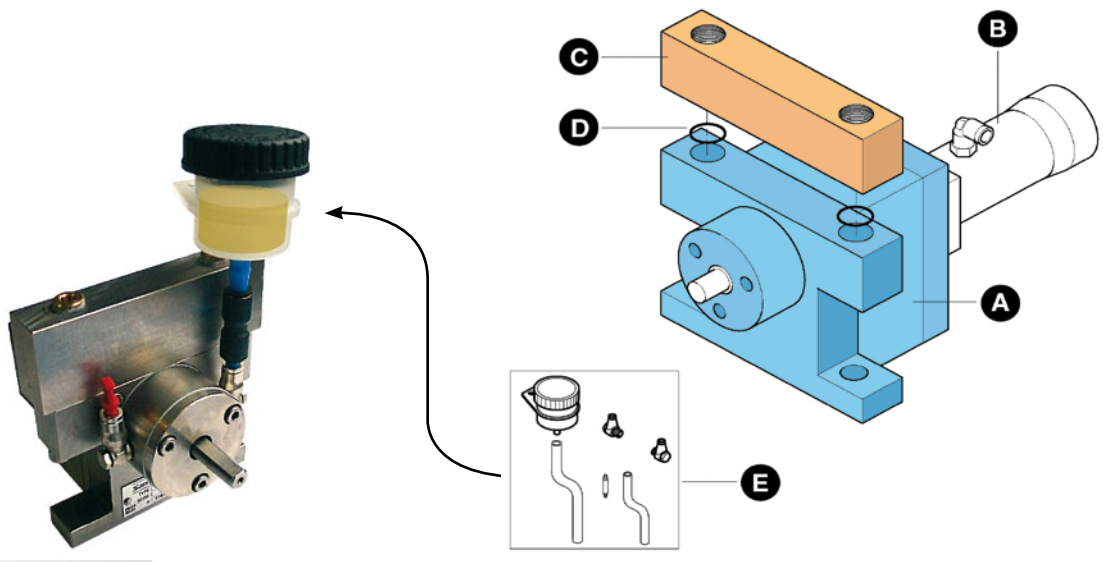
Optional base plate, refer to F mark on page 81

Components for H-shaped pump - ADLC (1) and STAINLESS STEEL

Description	Mark	Capacity (cm³/rev)	Reference
By-pass valve (2)	B	1.2 / 2.4 / 6 / 10	854 270
Connection base plate	C	1.2 / 2.4 / 6 / 10	730 269
O'rings (x2)	D	1.2 / 2.4 / 6 / 10	J3T TCN 011
MESAMOL supply (3)	E	2.4 / 6 / 10	854 279
		1.2	F6R BCL 021
MESAMOL sealant		1-litre can	H1H MIN 037

(1): ADLC = coated with very hard surface (very long service life of the pump).
(2): This allows not using the pump and rinsing the paint circuit at a maximum flow without damaging the gears; also avoids the bursting of the hoses in case of overpressure or locking of the pump.
(3): The pumps can be equipped with tightness device to avoid air passage through the product circuit (case of use of a hardener).

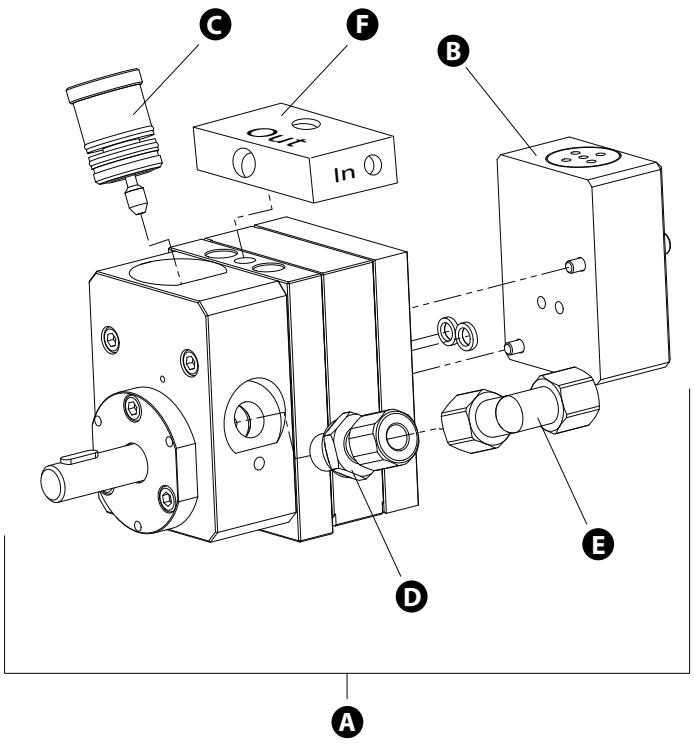
ATEX marking: pending certification



:: «Easy Rinsing» Pump, 6 cm³

Description	Mark	Capacity (cm³/rev)	Reference
Easy Rinsing Pump (ADLC)	A(1)	6	910 004 540
By-pass valve	B (2)		910 001 149
2-way micro-valve (orange indicator)	C		1 507 375
SS male single union 1/4 dia. 8mm	D		F6R XUQ 402
Multi-directional product elbow	E		F6R XCQ 313

(1): does not include F mark base plate (option)
(2): allows avoiding hose bursting in case of overpressure or pump locking



:: Optional base plate for compact and Easy rinsing pumps

Description	Mark	Connection	Reference
Connection base plate IN/OUT	F	for 1 pressure gauge	910 007 407
		for 1 reversed pressure gauge	910 007 408
		for 2 pressure gauges	910 007 409
		for fittings fixation	900 000 286

ATEX marking: pending certification

- New generation of pumps
- Ensures an accurate flow
- Dedicated to two-component products, either water or solvent based.
- The gear pump is easy to rinse; thus allowing time and rinsing product savings. This better rinsability is due to the absence of bearing hosing for driving and driven shafts.
- Tightness area cleaned thanks to a dedicated device.
- High cleaning performance upon colour-change phases.
- Anti-wear surface treatment on all inner parts.

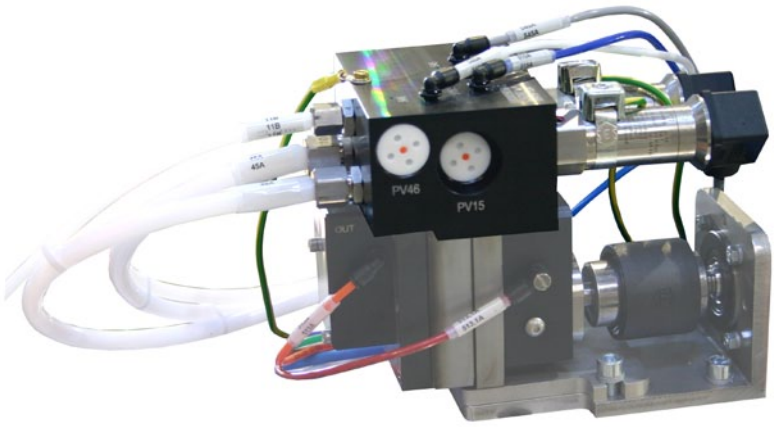
Reverse Flush

Reverse Flush is a block that **allows dumping and rinsing** the product supply system without going through the sprayer.

Reverse Flush comes in 2 versions, block and installation; it can be installed within all the paint unit configurations:
It will depend on the distance between the pump and the sprayer.

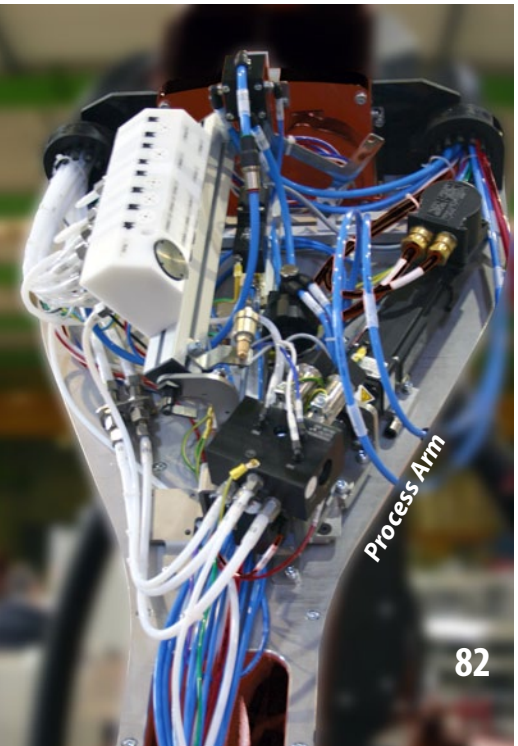
Remote Reverse Flush block

When the pump is to be placed far away from the sprayer (distance > to 1.5 m) as in the case of the « Slim Arm » on which no pump can be assembled, then the so-called “remote” reverse flush block is used and is ideally placed at a distance comprised between 1 to 1.5 m from the sprayer.



Built-in Reverse Flush block

When the pump is placed close to the sprayer (distance < to 1.5 m) as in the case of the “Process Arm”, then the reverse flush block is directly assembled onto the pump. The reverse flush block called “built-in” is used. This configuration is optimal with a simplified installation.



:: Customers' benefits: Numerous advantages are proposed

• The dump hose always remains clean and dry, thus high voltage return is not possible = **reinforced safety**

• The pump is kept apart from the product circuit, thus rinsing is easier and is carried out in masked time:
More over, pump and sprayer rinsing can be carried out independently = **Cycle time decrease and solvent saving**.

• The block is close to the sprayer thus allowing a smaller product hose diameter (Dia.: 4 mm instead of 5mm) = **Paint saving**.

• The pump priming with circuit 2 during the end of the spraying of circuit 1 becomes possible = **Cycle time decrease and colour change time decreased**.

• When the paint circuit is equipped with long lengths of hosing, the block can be placed any where on the paint circuit to cut the circuit, thus allowing dissociating the rinsing of both parts = **Optimization of rinsing times**.

:: Examples of installations that have been actually assembled:

The Reverse Flush block can be installed with any type of sprayer in internal charge version (solvent based paints) or external charge (water based paints), single or dual circuit, equipped with:
• a trigger valve and
• a dump valve
Ex: PPH 707-SB, PPH 707-MS-GUN, ACCULOOK 707-EXT, ...

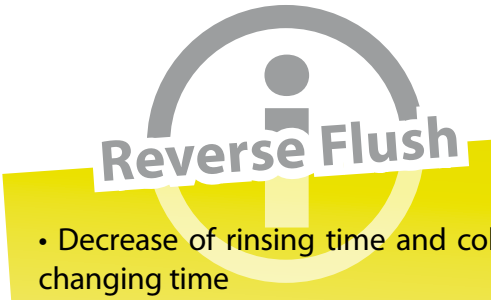
❶ **Single circuit** sprayer: pump placed at 1.5 m from sprayer => **Built-in Reverse Flush** block: The reverse flush allows decreasing the cycle time from 18 to 15 sec; i.e.: 16% saving on colour change time.

❷ **Single circuit** sprayer: pump placed at 5 m from sprayer => **Remote Reverse Flush** block: The reverse flush allows decreasing the cycle time from 29 to 21 sec; i.e.: 27% saving on colour change time.

❸ **Double circuit** sprayer: pump placed at 1.5 m from sprayer => **Built-in Reverse Flush** block: The reverse flush allows decreasing the cycle time from 14.5 to 5 sec; i.e. 62 % saving on colour change time !

❹ **Double circuit** sprayer: pump placed at 5 m from sprayer => **Remote Reverse Flush** block: The reverse flush allows decreasing the cycle time from 26 to 7 sec; i.e.: 80 % saving on colour change time !

Note: These values depend on the characteristics of the installation (hose diameters, type of product…)



• Decrease of rinsing time and colour changing time
• Rinsing product saving
• Paint saving
• Productivity increase
• Updating of existing installation
• Reduced bulk of the equipment
• Reinforced safety

:: Characteristics

Working pressure	Pressure
Rinsing product (bar)	5.5 (82,5psi) - 6 (90psi)
Rinsing air (bar)	5.5 (82,5psi) - 6 (90psi)
Product supply (bar)	5.5 (82,5psi) - 6 (90psi)

CE Ex II 2 G c T6

Type: REVERSE FLUSH
Technical file: BLOC PV

:: References

Description	Version	Reference
Reverse Flush Block	Remote	910 007 340(1)
	Built-in	910 007 773(2)

(1): The four fittings are included into the remote reverse flush block

(2): The four fittings are not included into the block reference: Please, consult SAMES

Microphone - Optical fibre

Microphone

The microphone **sensor** is designed for the reading of the **turbine** rotation **speeds** of all the Sames sprayers.

:: Description

The principle of rotation speed reading is acoustic-based. An air arrives at the level of the bell; it is guided by a groove and directed at each bell revolution to create a pressure variation that flows up to the sensor. This signal is then converted into electrical variations in order to adjust the bell rotation speed.

:: Customers' benefits

The rotation speed reading is made via an acoustic-based principle that presents numerous advantages:

> **Longer service** life: pneumatic hose through the robot arm and not through a cable (torsion, numerous movements ...)

> **Simple and reliable**: the connecting components are not sensitive to the dirt (paint)

> Pneumatic signal not influenced by electrostatic phenomena or CEM (electromagnetic compatibility).

> 100% **compatible** use with **high voltage** (breakdown, creeping ...)

:: Possible unit configurations

There are two possible uses to regulate the bell rotation speed.

• Either thanks to a speed regulation card (***diagram 1***) allowing then acting on the transducer to drive the turbine rotation air;

• Or by converting the sensor frequency into voltage towards a PLC (***diagram 2***). The minimal air hose length (Out) to the sensor is of 4.5 m with a requisite air pressure comprised between 1.9 and 3 bar. For an extension of this hose, increase the sensor inlet pressure by 0.4 bar per 30 cm.
The maximal recommended length is of 8 m.

diagram 1

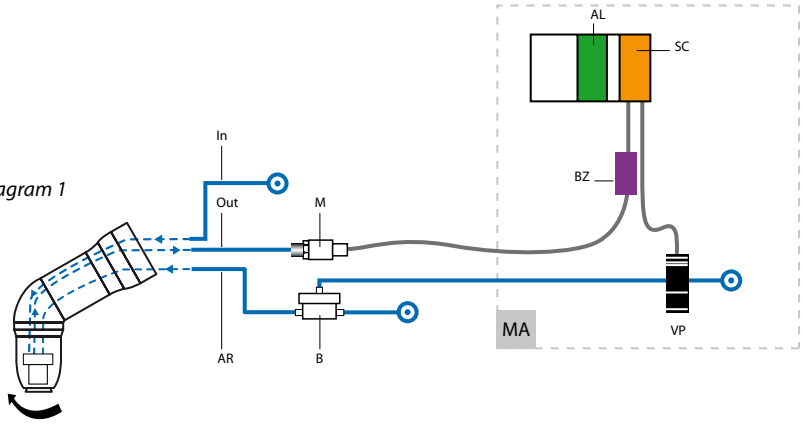
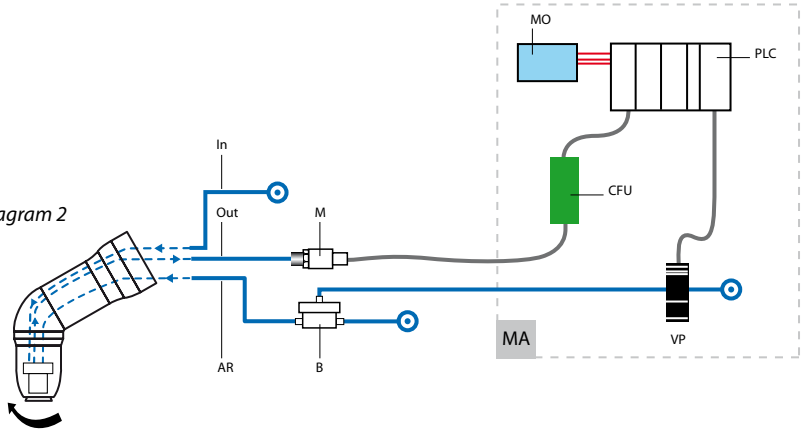


diagram 2



M : microphone sensor
B : air super-charger
VP : transducer
In : air inlet inside the sprayer
Out :air outlet towards the micro sensor
AR : turbine rotation air
AL : supply card

SC : speed regulation card
MO : monitor
CFU : frequency/voltage converter
PLC : programmable logic controller
MA : combined equipment, installation in non-explosive area
BZ : Zener isolation device

Optical fibre

The **turbine rotation** speed **reading** system can also be carried out by optical fibre. This solution is possible with the new **range 7** of Sames sprayers.

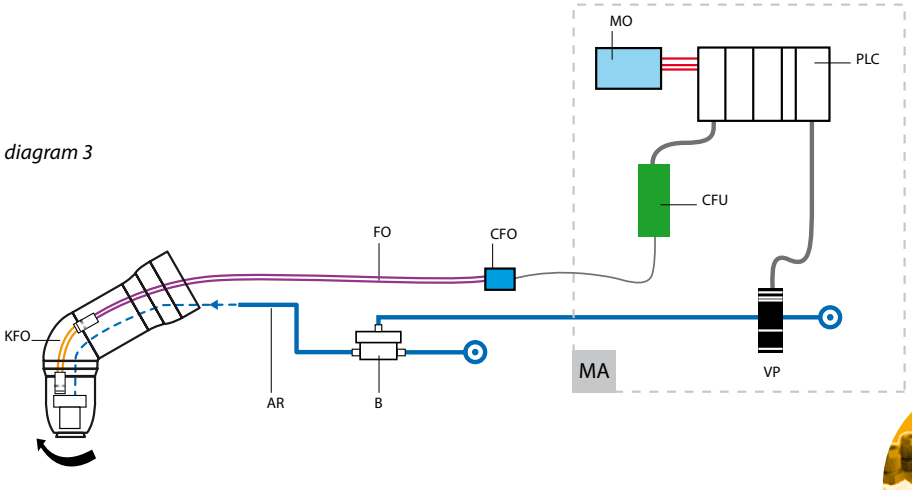
:: Description

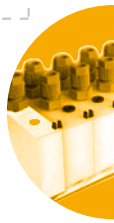
The reading of the turbine rotation speed is made thanks to a **fibre optics** principle. An «optical fibre Kit» unit (refer to *diagram 3*, **KFO**) includes the sprayer elbow.

One of both fibres emits a continuous luminous signal that reflects itself on the turbine shaft in a discontinuous signal of which frequency gives the rotation speed (2 luminous pulses/turbine revolution). This discontinuous signal is transmitted by the second fibre towards the optoelectronic converter (refer to *diagram 3*, **CFO**), thanks to an optical fibre kit of 8-m long (refer to *diagram 3*, **FO**). The electrical-pulse signal at converter outlet is recovered and analysed by the converter system Frequency/ Voltage (**CFU**).

At a 65000 rpm rotation speed, the frequency will be at 2.16 kHz.

diagram 3





KFO: Optical fibre kit
FO: Fibre kit (8-m long)
CFO: Optical fibre sensor (converter)
B: air super-charger
VP: transducer
AR: turbine rotation air
MO: monitor
CFU: frequency/voltage converter
PLC: programmable logic controller
MA: combined equipment, installation in non-explosive area

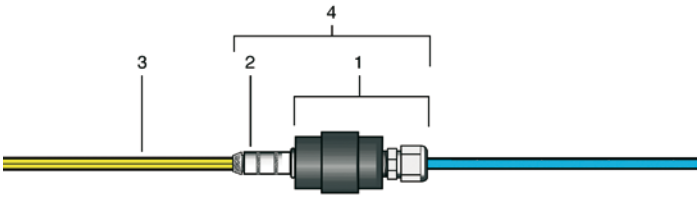
:: Microphone sensor

Description	Mark	Type	Reference
Assembled microphone sensor	1	Europe	851 488(A)
		US	459 881(B)
3-contact plug	2	EU/US	E4P TFS 195
Electrical cable (2 x 0.34mm2)	3	EU/US	E2H AAB 034
Microphone sensor plug + cable + fixation support	4	EU/US	1 522 885(C)

(A): air connection for an ext. ø6 hose (ref: F6R PUK 316) - 1/8'' BSP
(B): air connection for a ø1/4 hose (ref: F6R PUQ 210) - 1/8 NPT
(C): cable length = 20 metres and delivered with the 2 types of pneumatic fittings

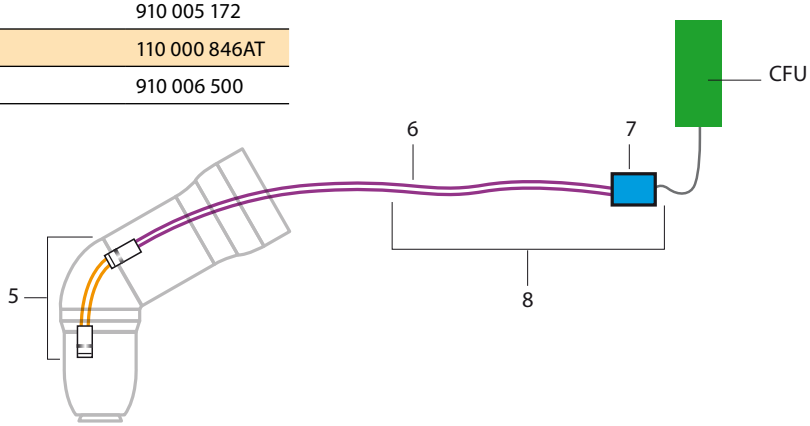
ATEX marking: ***Microphone***

CE Ex II (2)/2 GD
EEx SYST (ia IIB T4 - T135°C)
INERIS05ATEX007X



:: Optical fibre

Description	Mark	Type	Reference
Optical fibre kit in the elbow	5	PPH 707-SB elbow	910 005 173
8-m fibre kit	6		910 005 172
Optical fibre sensor	7		110 000 846AT
ATEX fibre kit	8		910 006 500



:: Speed regulation

Description	Mark	Use	Reference
Frequency/voltage converter	CFU	HVT turbine	1 525 628
		PAM turbine	1 510 042
Transducer	VP		R3V VPR 230
DP50 3/8 Air booster	B		R4D REG 040
TN5071 supply card	AL		851 288
Speed regulation card	SC	HVT turbine (BSC100)	220 000 010
		PAM turbine	851 697

PAM: turbine (45K rpm) used with the ACCUBELL 608 atomizer

ATEX marking:
F/T converter

CE Ex II (2) GD [EEx ic] IIC
INERIS04ATEX0086/1

HVP 125
High voltage probe

This «kilovoltmeter» device measures with accuracy the high voltage in «KV» at the end of the sprayer. It must be carefully grounded before use. Place the spherical end of the probe in contact with the sprayer end (bell or head).

It has to be used only in NON EXplosive ATmospheres.

Description	Reference
HVP 125	R9K VXM 030

AP 1000
Resistivohmeter

:: Use

The AP 1000 resistivohmeter is specially designed to measure with accuracy and quickly the resistivity of the paints and clears applied by electrostatics. This process works with any paints provided that their thinner incorporated before use gives these paints certain qualities making their spraying easier. The resistivity factor is of major importance. This device is of precious help to the paint optimization laboratories, to sub-suppliers control departments or to users of paints applied by electrostatics.

:: Description

This device is equipped with:

• A metallic box, an open cover, a control plate on which are displayed:
> A reading of the measure on 3 separate scales.
> The red, black or blue colour buttons allow choosing the measure scale adapted and corresponding to a resistivity bracket of the measured paint.

• A second measure, connected to the box thanks to a cable, resists to the usual solvents. When the device is not used, the probe is placed into a housing of the box.

Description	Reference
AP 1000	910 005 790

:: Resistivity measure contained between 0.5 MΩ.cm and 1000 MΩ.cm

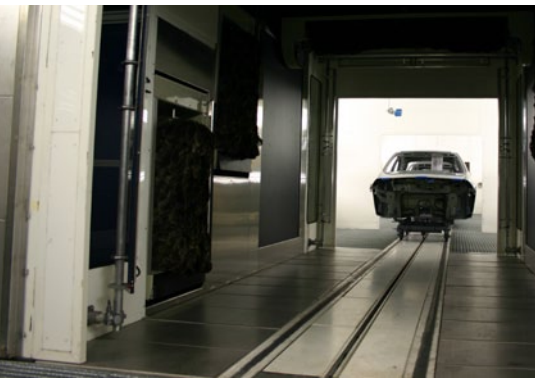
Beware: The operator must take a paint sample and carry out the measures in a non ATEX area.

Feather dusting machines

Sames proposes an exclusive system to blow off the dust from the car bodies before they enter the paint line.

After its assembly, the car body goes through a series of treatments to make it attacks-resistant (corrosion…); it is then ready to be painted.

Just before entering the paint line, the car body has to be dust or particle-free so that the colour application is the most perfect possible.



The basic principle is simple: the car body enters a machine like a «car wash» with rollers that wipes dry the body to eliminate the dust particles.

This machine is thus equipped with several rollers that follow the profile of the car body in turn and wipe it all along its surface.

With respect to the customer's process, air-knives can be added and feathers ionised to better catch the dust particles (the car body will have to be then de-ionised), thus resulting in several types of feather dusting machines.

Feather dusting machines

To be certain that the frictions of the rollers do not mark the car body and above all do not charge the car body with static electricity (this would render the paint application difficult), Sames has identified the ideal material: emu feather.

This clever system is thus called "feather dusting machine".

The feathers are fixed to rollers with a particular direction to optimize the surface in contact with the car body. This fixation is of course very solid to avoid feathers coming off.

:: Customers' benefits

> Roof tracking: Ensures the uniformity of the dusting all over the car body, notably along the vertical surfaces. It allows the dusting station working with a high speed conveyor.

> Control system:
Guaranties an accurate positioning. No risk of a too deep penetration of the car body inside the roller.

> Complete roller range:
Sames proposes rollers with small diameters in order to adapt the machine even more to the car body outskirts. If the diameter is too important or not adapted, certain parts of the car body can penetrate inside the rollers, thus ending up in the premature wear of the feathers.

> Rotation of +/- 90 ° of the roof beam:
Easy access for all the types of car bodies, notably thanks to the "car body tracking" function.

> Beam anti-colliding system:
Safer for the car body and the machine.

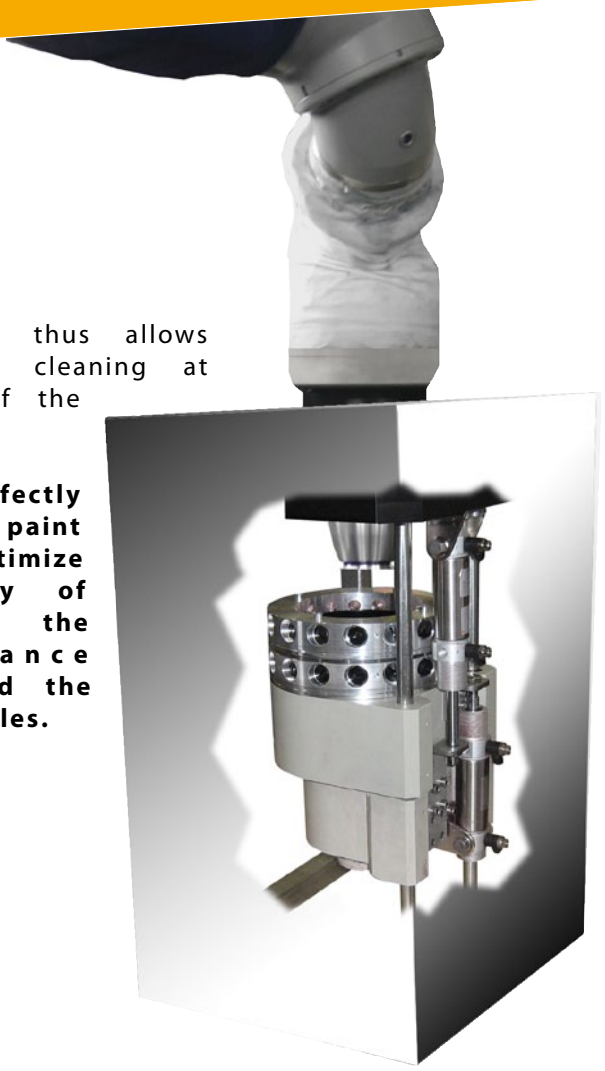
> Roller anti-colliding cells:
Safer for the roller and the car body.

> Equipped with de-ionising sprays (directed upwards and downwards):
More efficient than a standard blowing system.

> User-friendly supervision automatism:
Each parameter can be set with respect to the cutting table at each centimetre. Automatism the most flexible of the market. Remote updating possible.

> Reduced air consumption:
400 Nm3/H per portico.

> Reduced extraction air consumption:
12000 Nm3/H for 6-metre rollers.



Rinsing Box

Sames «rinsing box» allows the automatic cleaning of the pollution outside the atomiser, drying this latter, and then draining the used product during rinsing as well as the wastes from eliminated paints. It is specially designed for atomisers like ACCUBELL and PPH models, that can be equipped with all the existing types of bells; either high velocity turbine version (HVT) or magnetic bearing air turbine version (TPAM): ø35 mm, ø50 mm, ø65 mm or ø80mm.

The system thus allows a thorough cleaning at the level of the atomiser tip.

This tool perfectly fits into paint lines to optimize the quality of application, the maintenance process and the cleaning cycles.

:: Customers' benefits

Production increase:
This system guaranties a working time increase of the atomisers between manual cleaning phases: stopping for an operator's intervention is no longer required and the line can go on producing for a longer time. With respect to both applied paint and process, the operator synchronizes the rinsing cycles of the working atomiser.

Reduced maintenance:
With an automatic cleaning of the spraying head, production stops necessary to the interventions are drastically reduced; the cleaning quality is better ensured.

Cleaning of the most crucial sets:
The shroud tip and the bell are key parts as far as application quality is concerned.
On the other hand, they are the most sensitive to dirt. Thanks to its action, the rinsing box maintains their perfect state of work and their optimal performances; thus resulting for the customer in a prolonged application quality.

Protection of the environment:
The rinsing box permits the cleaning and the reclaim of the solvents. It allows reclaiming all the products used for cleaning. Customers can thus pride themselves on protecting the environment from polluting products avoiding for instance the wastes into the gratings.

This function is optional:
an air/product separator has to be installed. With a cyclonic effect, this separator is located between the box output and the venturi, thus creating an aspiration. This allows separating the air flow from the liquid products that are then reclaimed into a dump collector.

Easy maintenance of the discs used for the rinsing and of the reclaim tanks.

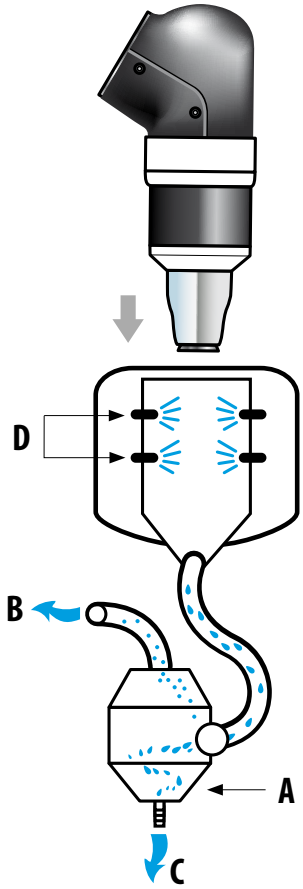
:: Description of the system

The whole unit is assembled onto a frame within the booth and has to be absolutely placed into a ventilated area. There are numerous usages of the box:

1 – Automatic cleaning of the shroud nozzle as well as the bell in order to avoid dirt build up due to the overspray that then generates spraying of grains.

2 – Drying of the outer part of the atomiser

3 – Reclaim of the rinsing product.



The atomisers come and prop themselves against a levelling pad, this latter is different depending on the atomiser being used:

- ACCUBELL Family
- PPH 707 Family
- ACCULOOK Family

A: Air/product separator (option)
B: Air flow exhaust towards the venturi
C: Product drainage towards a collector (separation rate between A and B superior to 90%)
D: Rinsing and blowing discs

:: Technical characteristics

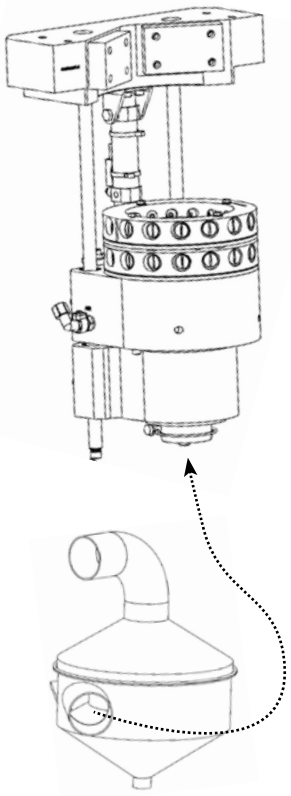
Supplies	Recommended pressure	Recommended flow
Air rinsing disc	6 bar (90psi) ± 0.5 bar (7,5psi)	200 at 400 Nl/min.
Product rinsing disc	6 bar (90psi) ± 0.5 bar (7,5psi)	2000 cc/min.
Air blowing disc	6 bar (90psi) ± 0.5 bar (7,5psi)	350 Nl/min.
Air Venturi	6 bar (90psi)	400 at 600 Nl/min.

ATEX marking: In compliance with Appendix VIII of the Directive 94/9/CE

CE Ex II 2 G c T5

Technical file: Rinsing box

:: Rinsing box

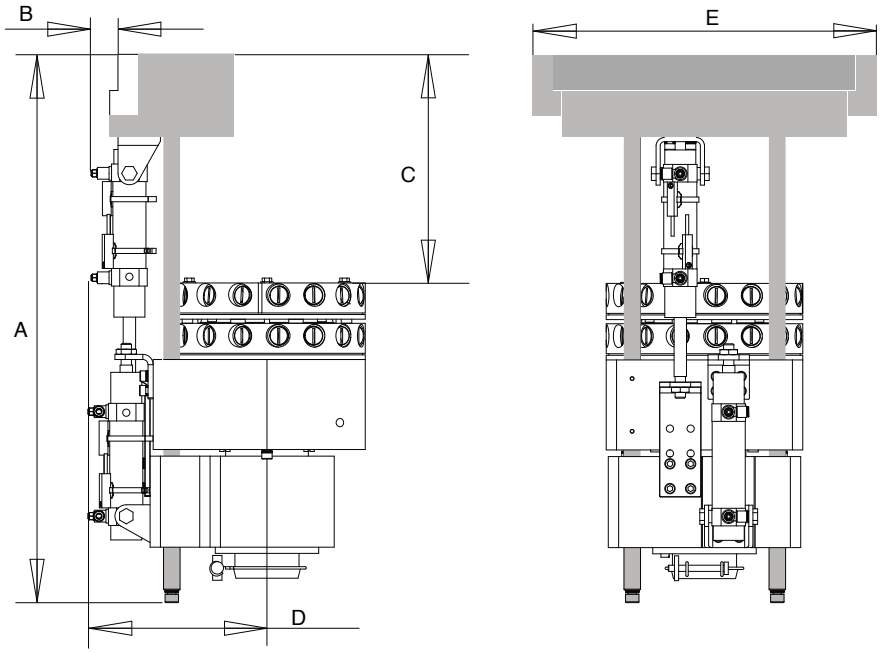


Description	Type of turbine	Type of bell	Reference
Rinsing box for PPH and ACCUBELL	HVT	EC 35 & EC 65	contact us
		EC 65 & EC 80	contact us
	TPAM	EC 35 & EC 65	contact us
		EC 65 & EC 80	contact us

Description	Reference
Air/product separator (option)	contact us

The separator has to be fixed horizontally and lower than the rinsing box, do provide for a correct down-flow slope and avoid all the low points. Place the venturi (ref: 900002578) at the nearest of the cover outlet, and for a maximum efficiency, the connection sheath (ø63.5 mm, ref: F6TCAL044, lg: 1metre) between the box and the separator has to be the shortest as possible.

:: Dimensions (mm)



A	B	C(1)	D	E
530 mm	16mm	222mm	168mm	332mm

(1) : ± 30mm depending on TPAM or HVT

EASYPAINT software programs

Programming tools 3D (Robcad, Paint PRO, MotoSim EG)

EASYPAINT SOFTWARE PROGRAMS

EASYPAINT is a **system** including all the most developed and proven techniques in terms of **supervision**, communication, remote control and simulation of **application**. Various software programs allow the operator visualising on the screen the process functions as well as the interfaces with the environment.

:: Advantages

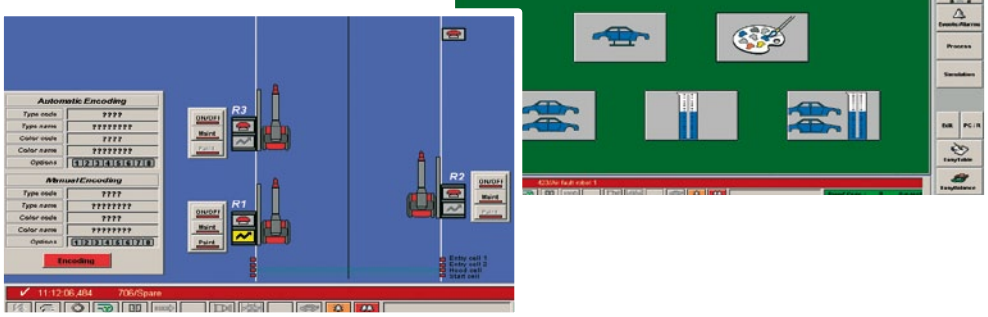
Numerous requirements characterize the manufacturing process in the field of the automotive production: production rate achievement, optimal quality seeking, flexibility, accuracy and limitation of the consumption of applied products.
Robotic is the answer to all these requirements.

A correctly worked out paint line will allow meeting the requested production rates while exactly reproducing the whished number of copies of a part with a constant quality level: from the beginning to the end of an operation without any change of rhythm in the process.

Another major concern of the industry is the respect for the environment.
To this end, the VOC (volatile organic components) emissions as well as of solvents have to be reduced. The accurate action of the robots in terms of opening/closing the paint sprayers allows controlling the applied products and thus reducing all the product losses. Then, thanks to the use of EASYPAINT system, products savings and emissions reductions can be made, without however decreasing the production rate. The process is thus optimised, while keeping a constant quality.

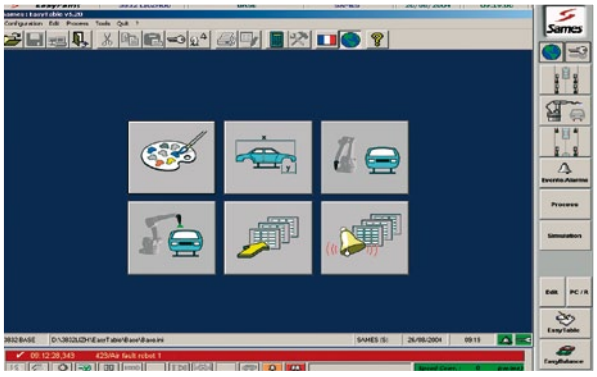
:: EasyPaint software programs

Easy View
• Visualisation of the process
• Control and management of the installation
• Management of the faults
• Simulation of an installation in real conditions



Easy Balance
• Daily production balance
• Production balance per car body type
• Production balance per colour
• Consumed paint quantity

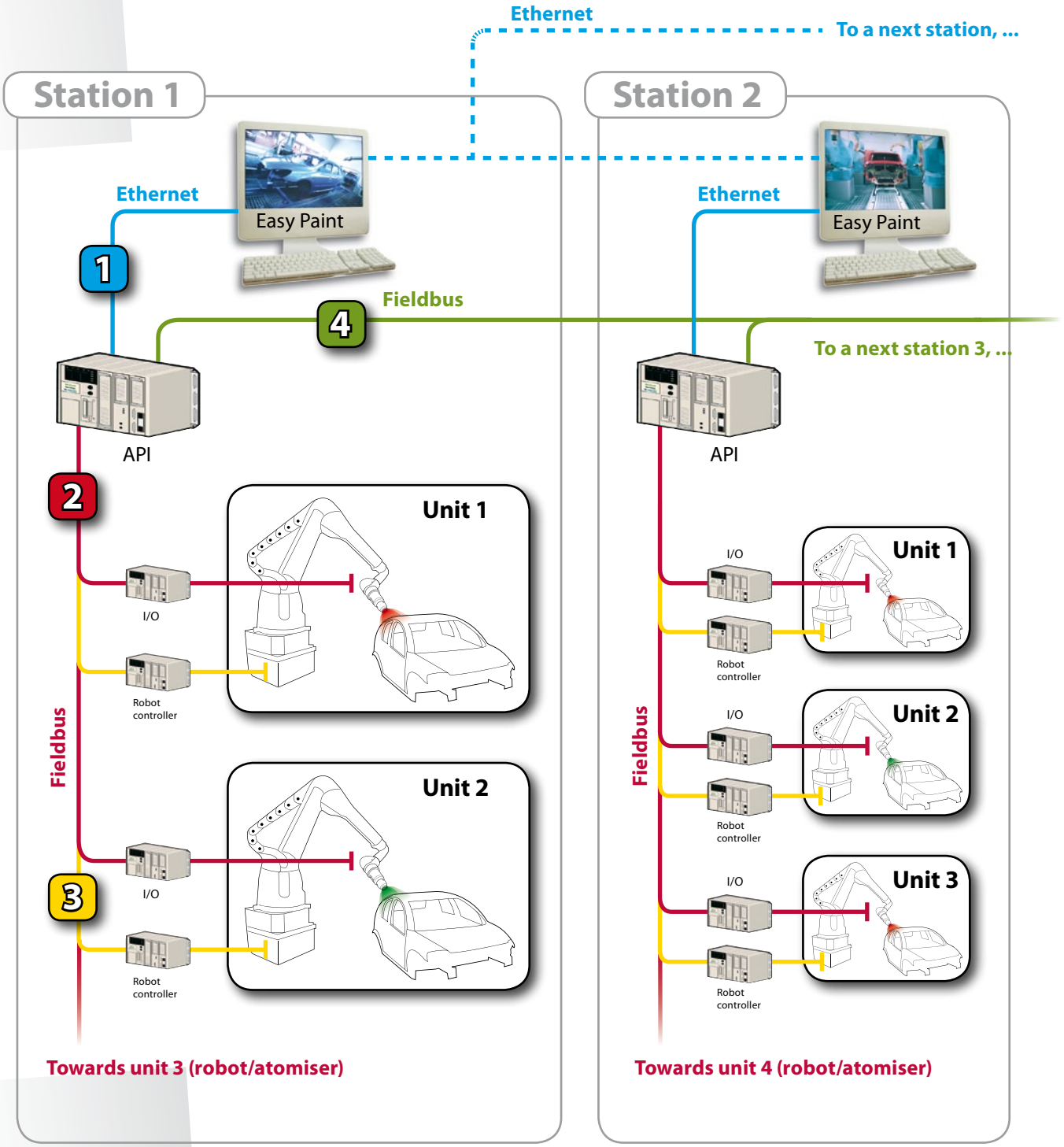
Easy Table
• Parameter setting of the installation
• Definition of the colours and types of car bodies
• Definition of the colour-change sequences
• Definition of the automatic spraying parameters



Logiciels Robot
• Back up of robot trajectories
• Transmission of the trajectories to the robots
• Back up of the «robots» programs
• Restore of the «robots» programs
• Editing of the trajectories

:: Software architecture

Schematic diagram



: Option

:: Communications

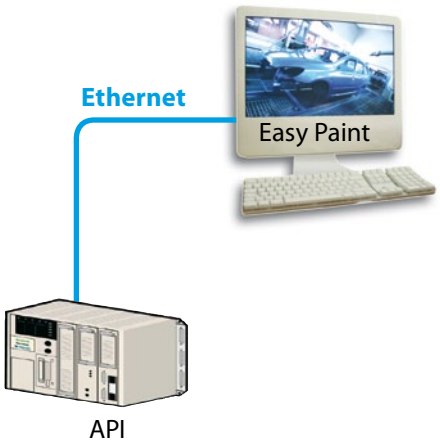
1 Exchanges between PC <-> Main PLC

:: From PC to main PLC:

• Control of the robots and sprayers
• Transmission of the spraying and system parameters

:: From main PLC to PC:

• Feed-back of analogical values
• Reading of parameter tables



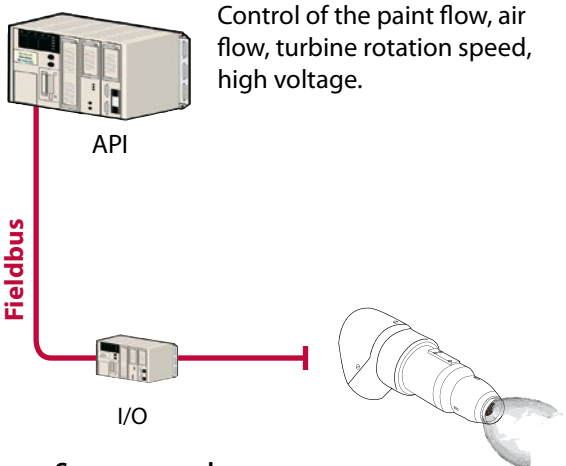
2 Exchanges between main PLC <-> Spraying panel

:: From main PLC to remote Input/Output:

• Set-values (air, flow, high voltage, turbine speed...)
• Digital inputs/outputs (air and product valves, light, inverter validations, panel on/off …)

:: From remote I/O to PLC:

• Set-values feed-back (air, flow, current, turbine speed ...)
• Digital inputs/outputs (inverter status, high voltage generator status, panel on/off, panel supplied with air …)



Sprayer panel:
Remote inputs/outputs
High voltage generators
Inverters
Frequency/voltage converter
Transducers
Electrovalves
…

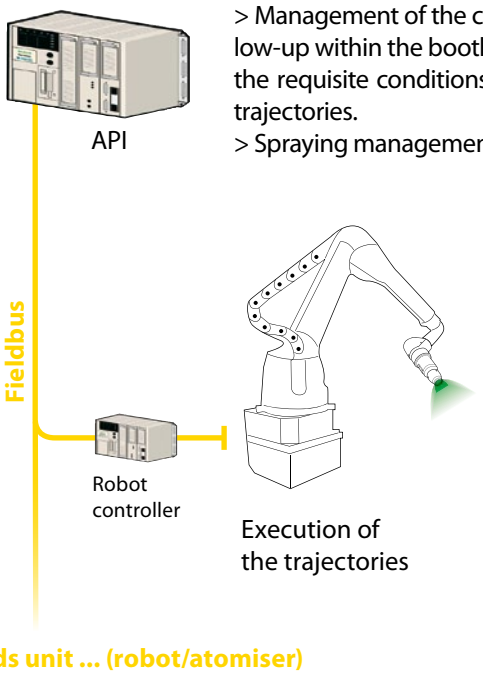
3 Exchanges between PLC <-> Robot controller

:: From PLC to robot controller:

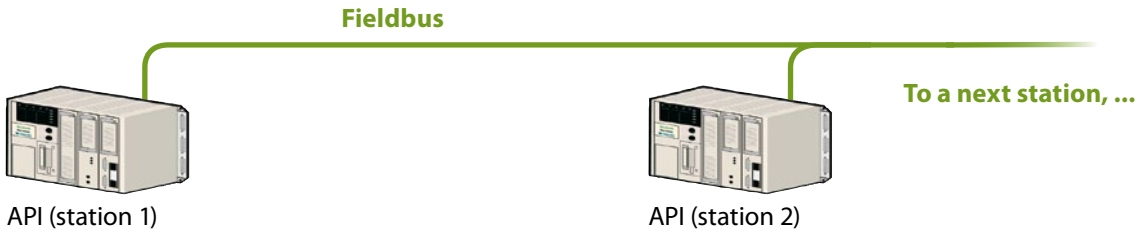
- Number of trajectory to be run
- Motors ON/OFF...

:: From robot controller to PLC:

- Robot status
- Position information message
- Number of spray to be run...



4 Exchanges between PLC <-> PLC

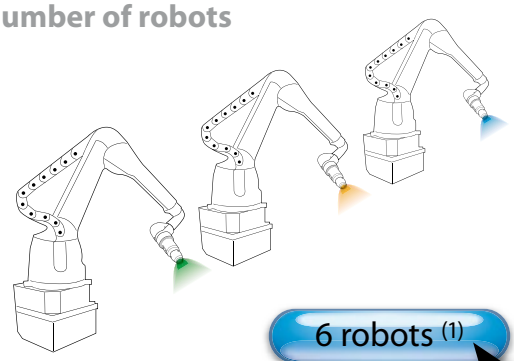


:: From the main PLC to other PLC:

- Codes of the car body under process on the line
- Position of the car body under process on the line

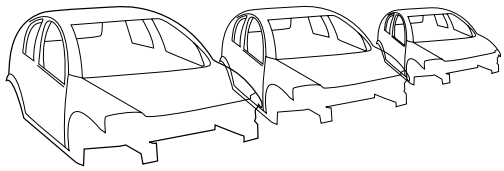
:: Basic configuration

Number of robots



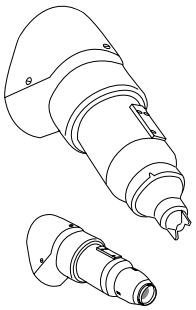
6 robots (1)

Number of outlines (type of car body)



20 types (1)

Type of sprayer



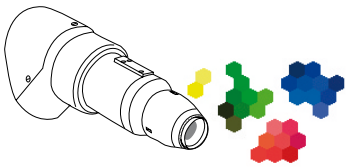
ACCUBELL 708

TRP 501 / 502

PPH 707-SB

...

Number of spraying families



15 families (1)

Number of colours

30 colours (1)

Number of colour-change families

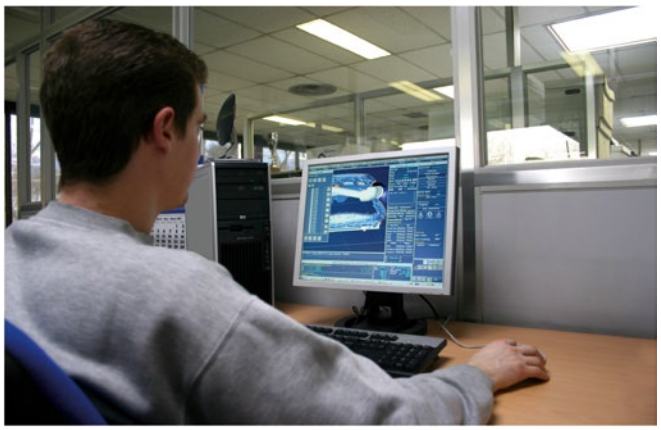
4 families (1)

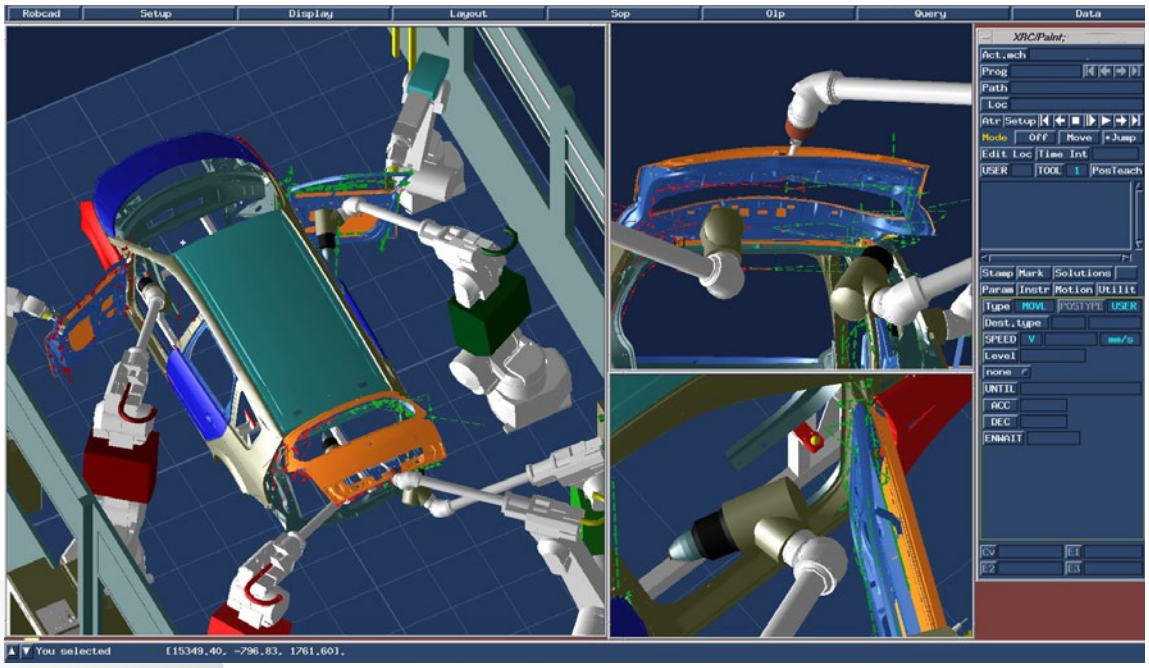
(1): the number can be adapted

3D and off-line programming expertise

Modelling of the application means
3D off-Line programming and simulation tool

Thanks to high-tech equipment and dedicated programs (**Robcad, Paint Pro, Motosim EG**...), our specialists model your project in 3D and carry out its programming, then the simulation of the robotic trajectories. The validation of the process on the screen presents obvious advantages: tests of the most efficacious trajectories, validation of the layout of the robots (accessibility) and of the robots cycle times, as well as precious time savings for the technicians upon commissioning on the production site.





Minivan interior painted in continuous: ACCUBELL 708-500 and ACCUBELL 608-250 assembled on robot with slim arm process

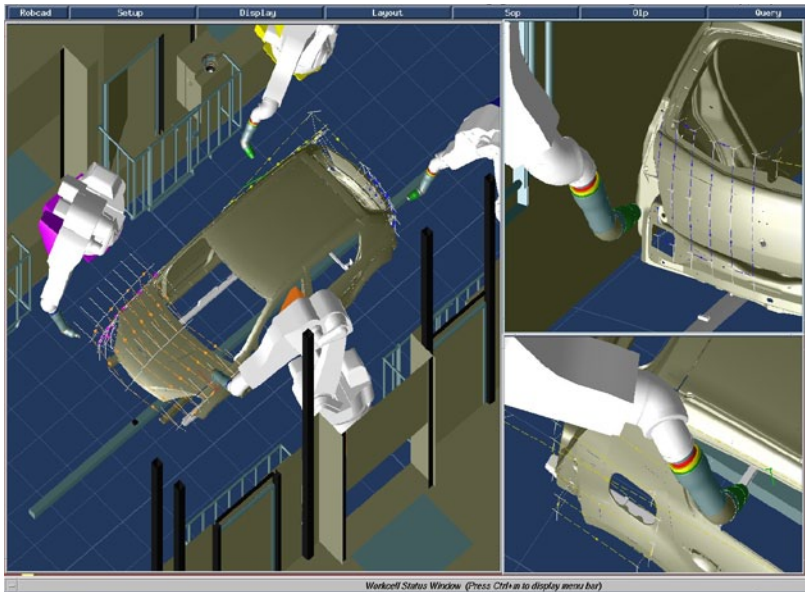
Functionalities

The two main functionalities of the **3D tools (Robcad, Paint pro, Motosim EG**…) are the following:

1/ Dimensioning of the equipment for a new paint line project: with respect to the production data (production rate, car body gauge, application range …) SAMES validates the solution that will be proposed.

These tools allow defining the number and the position of the robots as well as the application means to be installed.

2/ Working out the robots trajectories: Thanks to these tools (Robcad, Paint pro, Motosim EG…), the trajectories are programmed before the commissioning phase on site thus drastically reducing the time (thus the costs) of the debugging on site and for a start of production that will be advanced in proportion: in most of the cases, more than 95% of the time necessary to the programming of the trajectories of the robots is carried out with one of these tools, thus only less than 5% of keen adjustments made on site.



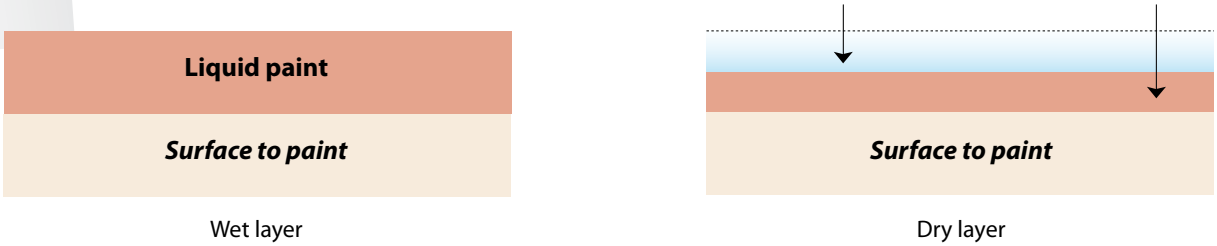
Exterior painted in continuous: PPH 707-SB assembled on 6-axis robot

These tools are also used for the production setting of a new car body model on **existing lines:** the 3D tool permits defining if the existing line has the capacity to process this new model. Then, similarly to a new paint line project, these tools will be used **to prepare** the robots **programming** to be able to start the production of the **new model** upon customer's decision.

Liquid Finishes

As we all noticed from finished parts, paint is a hard coating. However, we spray a liquid. This change of nature is caused for the most part by elements present in the material, whose function is described below.

The composing elements of a paint:



All paints are generally made of several components diluted in solvent (which may be water), which will eventually go back to solid after they dry out on the painted surface:

:: binding materials
:: pigments
:: charges (additives)

The binding materials are generally more or less transparent, like a resin. When diluted alone in solvent, it becomes a varnish:

Binding material + solvent = varnish

The paint is often given the name of the type of binding material it is made from; for example, cellulosic paints use cellulose as a binding material. To make the film opaque one adds very fine powders high in color called pigments.

Binding material + solvent + pigment = paint

To give the film particular characteristics (mechanical resistance, for example) quite a few charges and additives are added to the above mixture. Solvents dissolve the other components of the paint.
There are 3 big families :

:: Light solvents: evaporate quite quickly. So much so that the paint drops may dry before they reach the part, and not overlap correctly. They are never used by themselves, but combined with others.

:: Heavy solvents : evaporate rather slowly, allowing the paint to spread well as it hits the surface of the part. They provide the smooth and slick aspect of the film.

They are usually added in measured quantities to the light solvents, as they extend the drying time.

:: There are medium solvents: they evaporate in a few seconds, allowing the droplets to mix on the surface, and drying quickly enough.

To elaborate its paint, the paint manufacturer first considers the list of solvents which will be able to dissolve the binding materials he wants to use, and then picks up the ones whose volatility matches the type of drying method requested (air, oven). Just prior to spraying, the operator may add a thinner to his paint, to give it the fluidity (viscosity) required for his spraying operation.

Paint consistency

Viscosity

This physical dimension characterises the capability of a fluid to flow under pressure.

All materials are more or less viscous (including solid metals). To make it easier to understand: water is almost not viscous, oil is much more, and mayo even more. To characterize this, physicians use a unit called the Poise: in fact as it is rather a large measurement, they routinely use one hundredth of the Poise, called Centipoise.

To precisely measure the viscosity of a fluid takes a lot of time and heavy expensive equipment. In our industry, we always use consistency cups. They are little pre-sized funnels, with a calibrated hole. One measures the time needed to empty it, which is why we speak of a paint at 20s, or 40s, or 70s.

To mix it up a little further, there are various consistency cups, of different sizes and with different calibrated holes.

The most used ones in Europe are the AFNOR #4 (CA4) and the Ford #4 (CF4), which both have a 4mm calibrated hole.

The chart below shows correspondence between various cups, and the matching viscosity in centipoises.

AFNOR 4 (CA4)	ISO 4	mPas.s	Centipoises	Ford 4 (CF4)	DIN 4 (D°)	LCH (Fr)	ZAHN (n°2)
12	-	20	20	10	11	6	18
14	17	25	25	12	12	7	19
16	23	30	30	14	14	-	20
20	34	40	40	18	16	8	22
25	51	50	50	22	20	9	24
29	60	60	60	25	23	10	27
32	68	70	70	28	25	-	30
34	74	80	80	30	26	11	34
37	82	90	90	33	28	12	37
40	93	100	100	35	30	13	41
45	-	120	120	40	34	14	49
50	-	140	140	44	38	15	58
56	-	160	160	50	42	16	66
61	-	180	180	54	45	17	74
66	-	200	200	58	49	18	82
70	-	220	220	62	52	19	-

Nota : 1 poise = 100 centipoises and 1 mPas.s = 1 centipoise.

Paint consistency (next)

Temperature and viscosity

Viscosity of paint changes with variations in temperatures; basically, the resins are far more fluid when they are hot.
The table below shows the changes in viscosity of a glycerophthalic paint as the temperature varies. It is worth that a paint wich has a viscosity of 22s at 20°C will have a viscosity of 28s at 12°C and of 17s at 32°C.

viscosity in seconds CF4	Temperatures (°C)																			
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
	27	26	24	23	22	21	21	20	19	18	18	17	17	16	15	15	14	14	14	14
	33	31	29	27	26	25	23	22	21	20	19	18	18	17	16	16	15	15	14	14
	39	36	34	32	30	28	26	24	23	22	21	20	19	18	17	17	16	15	15	14
	46	42	39	36	34	31	29	27	26	24	23	22	21	19	18	17	17	16	15	15
	54	49	45	41	38	35	32	30	28	26	24	23	21	20	19	18	17	17	16	15
	56	51	47	43	40	36	33	31	29	27	25	23	21	20	20	19	18	17	16	16
	61	55	50	46	42	38	35	32	30	28	26	24	22	21	20	19	18	17	16	16
	69	63	56	52	46	42	39	35	32	30	28	25	24	23	21	20	19	18	17	16
	77	69	62	55	50	46	41	38	35	32	29	27	25	24	22	21	19	18	17	16
	84	74	67	61	54	50	44	40	36	34	30	28	26	25	23	22	20	18	17	16
	95	84	75	66	60	54	48	44	40	36	33	30	28	26	24	22	20	19	18	17
	104	92	81	73	65	58	52	46	42	38	35	31	29	27	24	23	21	20	19	18
	112	100	88	76	69	62	54	49	44	40	36	32	30	27	25	23	21	20	19	18
	122	108	90	85	75	66	59	53	47	42	38	35	31	28	26	24	22	21	19	18
	132	120	102	90	80	70	63	55	50	44	40	36	33	30	27	25	23	22	20	18
	142	124	108	95	84	74	65	58	52	46	41	37	34	31	27	25	23	22	20	18
	152	132	119	101	90	80	69	61	54	48	43	38	35	31	28	26	24	23	21	18
	164	140	123	106	94	83	73	64	56	50	45	40	36	32	29	27	24	23	21	18

Example: under 22 degrees C, for a required 22s viscosity:
One seeks a 28s visco at 12C, and a 17s visco at 32C

Significant differences in flow and quality will occur during the day:

	Temperatures (°C)	Viscosity - CA4 (s)	Paint flow (cc/mn)
Morning, cool shop	15	23	460
mid day, warm shop	20	20	520
Oven on	25	17	560

In this instance, the paint warmed up by 10 C (50 F), changing the visco from its original 23s to 17s, and raising the flow at the sprayer by 22 %, resulting in sags and runs.

Even worse, a paint prepared at 20s in a warm atmosphere (20C), may reach 28s the next morning, before the temperature rises: the sprayed film will be coarser, and will take longer to dry.

:: Advice:

Keep temperatures as close to 20C (70 F) as possible: that's the temperature of choice given by the paint manufacturer for most applications. If the paints are stocked in a non conditioned room, take to the spray booth the cans that are going to be used the next day at least 12 hrs ahead of time. It is well advised to install a paint-heater on-line, delivering a constant, say 25C (77 F), to the applicator, regardless of the outside or ambient temperature. Warning With 2-k and multi-components materials, the pot-life is dramatically reduced when their temperature is raised. The paint manufacturer must be advising on such an installation.

Paint consistency (next)

Paint resistivity

Resistivity describes the capability of a material to oppose the passage of electricity.

In a paint line, the lower the resistivity of a paint (< 10 MΩ.cm), the higher the amp-draw from the HV generator (UHT), and vice versa.

How does resistivity affect a paint system ?

It will have 2 influences:

:: On the electrical consumption of the paint and solvent circuits (and then the configuration of the system).
This is a concern of those direct charge systems, with grounded paint circs, and their amp-draw readings between the HV (injector, bell-cup) and the first grounded part (fitting, flow-meter, pressure pot, Q/D).

:: On the charge of the paint droplet (and the application properly speaking):
The lower the resistivity, the better the charge.
The higher the charge, the better the electrostatic field, the higher the transfer efficiency.
However, the side effects of electrostatics are going to be also higher; overloaded edges, light coverage inside cavities.
Also, the lower the resistivity, the higher the backspray and applicator soiling: airs shroud, body,...

What is the best resistivity window ?

We measure it with a meter called the «**AP 1000** resistivohmeter».

All values indicated by Sames are taken with this particular piece of equipment. Sames insists that the meter only gives an indication, not a precise measurement.
Though no rule may be firmly established, (the level of charge brings forth the notion of time), Sames feels that a paint with a resistivity just under 500 MΩ.cm will generate a low electrostatic efficiency, particularly if the HV is also low (20/30KV).
On the contrary, a low resistivity paint (< 10 MΩ.cm) will generate a fast soiling of the equipment, overloads and thin areas, albeit providing a generally high transfer efficiency.
Too low resistivity material in the paint line, will result in too much amp-draw for the available current provided by and depending on the UHT.
The risk is, not to be able to spray correctly, with recurrent over-current faults. When on the edge with some materials, it is mandatory to test them to validate a system design.

Metallics: When measuring resistivity from a metal based paint , the reading is that of the resin and solvent.
For electrostatic spraying, the type and quality of the coating of the metal flakes (aluminum), is all important for the non-shorting of the paint line to ground.
Up to a set up value, the paint line may consume microamps in relation to the material.
Should that value be reached, the power supply (GNM 200) faults into disjunction, or by current limitation, resulting in a very low high voltage, or no high voltage at all.

Main everyday solvents

Properties of products	Boiling temperature (°C)	Flash point (°C) (CF) (1)	Explosive limit in vol. %		Toxicity limit of concentration in the air (2)	
			Lower	Upper	P.P.M. (3)	mg/m³
Amyle acetate	149	25	1.1	7.5	100	525
Butyle acetate	124-126	23	1.7	15	150	710
Dry butyle acetate	112	31 (**CO**)	1.7	-	200	950
Ethyle acetate	77.1	- 4.4	2.2	11.5	400	1400
Ethylglycol acetate	156.4	52	1.7	5.8	100	540
Isopropyle acetate	93	4.4	1.8	8	250	950
Methyle acetate	57-58	- 13	3.1	16	200	610
Acetone	56.2	- 18	2.5	12.8	1000	2400
Amylic alchohol	137.8	33	1.2	10	-	-
Butylic alchohol	117.5	29	1.4	11.2	100	300
Dry butylic alchohol	99.5	24	1.7	9.8	150	450
Ethylic alchohol	78.5	13	3.3	19	1000	1900
Isopropylic alchohol	82.4	12	2	11.8	400	980
Methylic alchohol	65	12	6	36.5	200	260
Benzene	80.1	- 11	1.4	8	25	80
Butylglycol	171743	60	1.1	10.6	50	240
Cyclohexane	81	- 20	1.3	8.3	300	1050
Cyclohexanol	161	68	1.8	-	50	200
Cyclohexanone	156	44 to 64	1.3	9.4	50	200
Diacetone alcool	168	54-55	1.8	6.9	50	240
Dioxane 1-4	101	12.2	2	22	100	360
Terebenthine essence	154-170	35	0.8	-	100	560
Special essences	30-210	4	1	6.5	-	-
Ethylglycol	135	40	2.6	15.7	100	370
Methylethylcetone	79.6	- 6	1.8	11.5	200	590
Methylisobutylcarbinol	130	41	1	5.5	25	100
Methylisobutylcetone	116	16	1.4	7.5	100	410
Methylglycol	125768	46	2.5	14	25	80
Naphta solvent (**4**)	125-160	23 to 32	0.9	6	100	400
Styrene	146	31	1.1	6.1	100	420
Tetrahydrofuranne	64-66	- 17	2.3	11.8	200	590
Toluene	110.6	4.4	1.3	7	100	375
Trichlorethylene	87	non-flammable	-	-	100	535
White spirit	135-205	30 to 65	1.1	6.5	200	1150
o-Xylene	144	30	1	6	100	435

(1): CF = closed dish; CO = open dish

(2): these values were established by American hygenists corresponding to 7-8 h/day and a 40 h/week

(3): p.p.m. = parts per million, by volume

(4): derived from coal

(Extract from n°103 INRS brochure)

Parts electrical continuity

Generally speaking, metallic components do not cause problem for electrostatic spraying. However, some conditions need to be met when spraying non metallic parts.

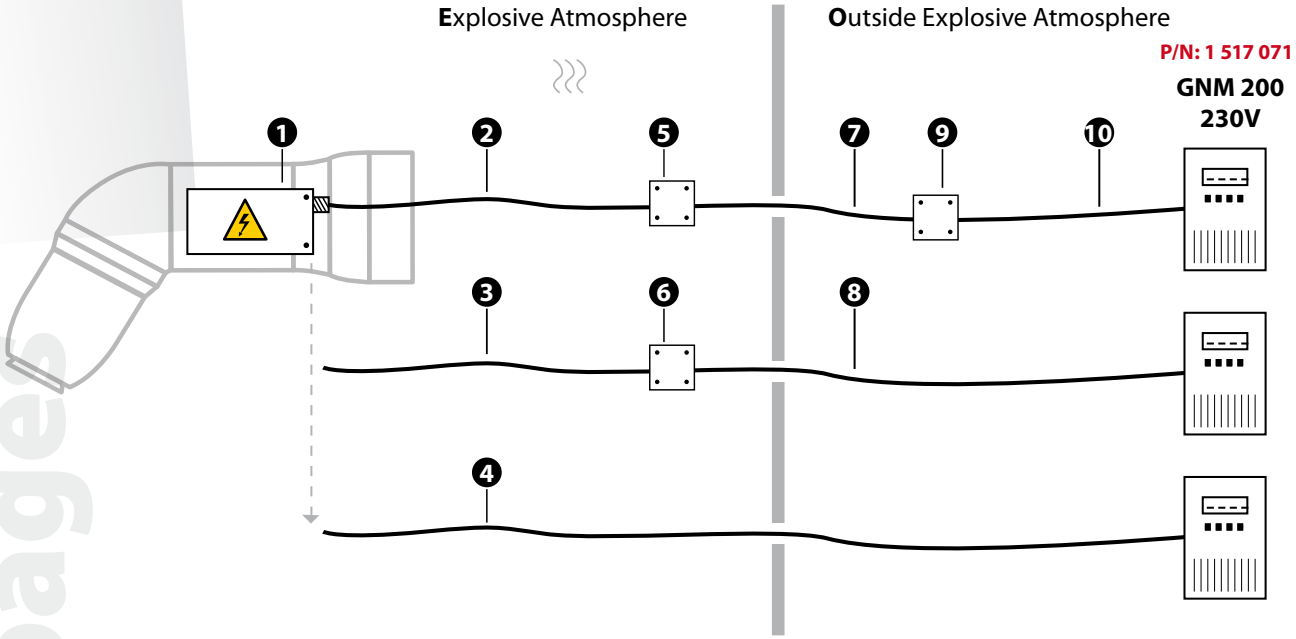
Plastics are even trickier. Their conductivity is extremely low: 10^{12} to 10^{17} MΩ.cm, and they need to be made conductive. For the odd job, one may spray them with some conductive solvent. For mass production, it's best to have the plastics mixed up with some conductive material, when possible, at time of fabrication. Another solution is to spray them with a light coat of a conductive primer. Sometimes, when the part is thin enough and needs be finished on one side only, it is placed on a metal holder of the same shape, which also permits to ground it. Some systems may combine above solutions.

Hooks and racks continuity

For the parts to attract the paint drops, they and whatever they are hanging from must be properly grounded. An uninterrupted connection must be established from the part throughout the rack, the hook, the rotator to the conveyor, which is grounded by construction.

Such a connection must be checked upon periodically, as with time, the racks etc. may be covered with paint residues isolating them from the ground, damageable to the good operation of the system, and creating a potential fire hazard.

:: Recommended configurations between the high voltage unit and the control module



References of the configurations per sprayer (UHT + Low voltage connection, 30m maxi. + terminal box)

Sprayers	1	2	3	4	5	6	7	8	9	10
	High voltage unit (UHT)	Lg = 4.8 m **1 527 252** Lg = 8 m **910 001 236**	Lg = 4.8 m **1 527 252** Lg = 8 m **910 001 236**	Lg = 20 m **1 514 591**	Terminal box **1303899AT**	Terminal box **1303899AT**	Lg = 5.2 m **910000086**	Lg = 22 m **1 520 516**	Terminal box **1303899AT**	Lg = 17 m **910000070**
ACCUBELL 708/500, ACCUBELL 708/800, ACCUBELL 708-2K/500	UHT 156 EEx m **90 kV/100 µA** - Lg = 8m **1 524 168**	-	-	-	✓	-	✓	-	✓	✓
	UHT 156 EEx e **90 kV/100 µA** **1 518 965**	✓	-	-	✓	-	✓	-	✓	✓
		-	✓	-	-	✓	-	✓	-	✓ or **Mark 8**
		-	-	✓	-	-	-	-	-	-
ACCUBELL 608/250	UHT 156 EEx m **70 kV /100 µA** - Lg = 8m **910 003 850**	-	-	-	✓	-	✓	-	✓	✓
PPH 707-SB/MS/2K, ACCULOOK 707-SB	UHT 157 **100 kV/200 µA** **910 002 870**	-	**Lg = 8 m** **910 004 015**	-	-	**900 003 576AT**	-	✓	-	✓ or **Mark 8**
PPH 707-EXT ACCULOOK 707-EXT	UHT 330 EEx e **85 kV/500 µA** **910 007 139**	✓	-	-	✓	-	✓	-	✓	✓
		-	✓	-	-	✓	-	✓	-	✓ or **Mark 8**
		-	-	✓	-	-	-	-	-	-
TRP 501/502 Specific module version GNM200 230V P/N: **1 517 070**	UHT 152 EEx e **100 kV/200µA** **1 511 102**	✓	-	-	✓	-	✓	-	✓	✓
		-	✓	-	-	✓	-	✓	-	✓ or **Mark 8**
		-	-	✓	-	-	-	-	-	-

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